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NEWSPAPER

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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NEWS IN BRIEF

Itel Gets Injunction Against IBM Abroad

SAN FRANCISCO – IBM has been prohibited by a court in Germany from refusing to service and maintain its System 360/30 computers with Itel add-on memory attached.

In addition, the court held that IBM had unfairly tried to restrict competition by attempting to withhold service on the system.

A U.S. District Court in San Francisco in 1972 ruled on this same question and also issued a similar injunction against IBM's refusal to maintain its equipment in the U.S.

In granting its preliminary injunction, the German court said: "... The court has been convinced that the defendant has no valid reason to refuse the further maintenance of its equipment because the publishing house has installed the add-on memory of the plaintiff.

"In particular, the court is convinced that there are no unacceptable technical or economic obstacles servicing and maintaining the system caused by the add-on memory of the defendant.

"Finally it has been shown to the satisfaction of the court that the defendant is a company dominating the market of EDP systems within the meaning of section 26 of the act against restrictions of competition."

3,145 Applications Filed For CDP Exam, Most Since '65

PARK RIDGE, Ill. – The number of applications received for the 1973 Certificate in Data Processing (CDP) examination was the largest since 1965, according to the Data Processing Management Association (DPMA), sponsor of the examination.

A total of 3,145 applications were filed by the Dec. 1 deadline. This compares with 2,944 for the 1972 examination. The 1973 examination will be given Feb. 17 in 100 test centers at colleges and universities in the U.S. and in Canada.

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370 Lease Plans Promise Bonanza

By a CW Staff Writer

HARTSDALE, N.Y. – Users who wish to keep all-IBM installations can now save as much as 60% on 370 leases from DPF Inc. here.

The savings can go higher, the firm said, if the user wants to take a mixed system made up of an IBM CPU and independent peripherals.

The new plan, which includes operating (short term) as well as full payout leases, features leases that run from three years to 10 years, the firm said. Options to drop a three-year lease can be made after one year, the firm said.

Spotlight on User's Lib

Previously, most leases for 370 equipment that offered the user substantial savings required firms to take a package of IBM and independent equipment, but DPF said it will lease all IBM systems at a savings also.

On an eight-year lease, the savings on an all-IBM configuration could run to almost 60%, the firm said, adding the savings on a five-year lease could be between 35% and 45% and the savings on a three-year deal would be around 25%.

At the same time, the firm promised to "be very competitive on packaged lease deals," where the user gets an IBM CPU and independent peripherals.

The savings with this type of plan could add approximately 5% to 10% to the savings available on the all-IBM deal, depending on the configuration and length of the lease, DPF said.

The firm said it had working arrangements with several of the independent peripherals makers to sell their equipment in these mixed configurations and so was not tied to any one independent producer.

On a 370/158 CPU the firm indicated users could save as much as 53% off the IBM price with an eight-year lease.

The figures show the savings would be almost $17,000 off the normal IBM price of $39,000. But when a two-shift overtime charge is added to the IBM figures the total price

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Common Interface Vetoed, NBS Asks Some Standards

"We are convinced that interface standards confined to selected computer system functions of limited applicability are technically feasible."

By E. Drake Lundell Jr.
Of the CW Staff

GAITHERSBURG, Md. – No single interface standard should be developed for all peripheral equipment, but the government should begin working on developing selected standards particulary in the tape and disk area, a National Bureau of Standards draft report indicates.

At present, "neither the engineering information nor the engineering capability now exists to produce an interface specification broad enough to achieve universal applicability for all peripherals and all CPUs," according to the draft report on "Means of Achieving Interchangeability of Computer Peripherals."

"As a result, the development of a single interface standard would be too costly and of too amorphous a nature to justify," the report by the Center for Computer Sciences and Technology of NBS added.

But while rejecting the idea of a universal interface, the report, by recommending specific standards and a federal center to test equipment against those specific standards, held out hope for users wanting to achieve cost savings through the greater interchangeability of peripherals.

"We are convinced that interface standards confined to selected computer system functions of limited applicability are technically feasible," according to the report.

"Examples would be standards for selected tape unit and disk unit interfaces. From a functional viewpoint, the number of standards for such selected interfaces would be substantially less than the number of existing interface types," it added.

The establishment of such standards should be "of significant benefit" to the Federal Government and other computer users, in addition to the independent peripherals industry, the report noted.

"We find frequently today the situation where, for instance, the interfaces between a given tape unit and the CPUs of two different manufacturers differ un-

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Xerox Says No To Independent Add-On Memory

By Ronald A. Frank
Of the CW Staff

VAN NUYS, Calif. – Xerox Corp. has told one of its Sigma CPU users that it will no longer provide maintenance if an independent memory is installed.

For the West Coast user a savings of more than $50,000 is involved in the choice of a Xerox memory or the Signal Galaxies Inc. add-on. "We have gone to our legal staff for an opinion on this," the user said, adding that Xerox had sent him a letter stating it would not provide maintenance if the Signal Galaxies memory is attached to the mainframe.

The letter, sent last November, said Xerox does not permit add-on memories to its leased systems and it does not offer

(Continued on Page 2)

Board Challenged

DP Selection Stirs Town

By Michael Weinstein
Of the CW Staff

FRAMINGHAM, Mass. – A computer advisory committee which recommended that this town lease a $180,000/yr IBM 370/135 has been accused of being biased toward IBM by many critics who feel the town's needs could be best met by a minicomputer in the PDP-8 range.

The selection committee was made up of a pro-IBM user, an IBM employee, a former IBM employee, a data processing teacher and a Honeywell employee.

The ad hoc advisory committee was initially formed two years ago with the stated purpose of helping the town department of education choose hardware for its planned Regional Vocational Technical School.

This school will open its doors this year to a student population aimed at reaching 1,000 by 1976. Of these students about 100 are expected to take data processing classes.

If the town follows the committee's recommendation, it will pay $315,727 for the first year of operation of the computer hardware even though J. Gordon of the city's finance committee noted only 15 students would receive training as future data processors the first year.

This meant, Gordon said, that the committee was recommending the town pay over $20,000/yr/student.

Started more than two years ago the committee was directed by IBM user Philip Frank and was to be open to all local citizens with any DP background. The initial membership was 12, but many local citizens claimed they were never informed of the committee's existence.

After two years of meetings, the membership dwindled to five and the committee then consisted of Frank as chairman, the IBM employee, the former IBM employee and two others.

This smaller committee ruled out other vendors' bids as "being unresponsive," according to outside sources and worked to justify the leasing of the 370/135.

Finally, last December the committee decided to vote on equipment selection with the IBM employee and the Honeywell employee maintaining it would not be fair for them to vote.

Of the three voting members left the former IBM employee voted for the 135 along with a local teacher. With the vote now 2 to 0 for IBM, Frank chose not to vote.

From this vote an intent agreement was profferred to accept the IBM machine.

Shortly after the meeting, several local

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Town Upset by DP Selection, Challenges Committee on Vote

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residents publicly objected to the committee recommendation.

The vocational school offices issued the first official description of the courses to the guidance departments of the towns, for distribution to potential students.

The course of study shown, on examination, was not as Frank had listed in the computer specification requirements – to produce "systems programmers in a multiprogram operating system environment," or "systems designers in utilizing multiprogrammed equipment effectively in a batch or time-shared mode as well as the use of on-line inquiry or data-collection systems."

The leaflet simply said the student who progressed through the three-year program would qualify as a trained computer console operator and perhaps a computer programmer.

The leaflet also listed training equipment to be used as including unit record items – sorters, collators and accounting machines (which were not in the budget request).

Frank, now under pressure to justify his committee's choice of IBM, likened the procurement of computer equipment to buying other material: "When a vocational school buys a lathe," he said, "they get the best one available. Then, next year they start training a new set of boys, and a new lathe comes on the market with some fancier buttons – they go and get that."

"A computer," he explained, "is just like a lathe – but it attracts more attention."

The local teacher who had voted for the procurement of the IBM equipment then said he wished to retract his vote, maintaining that the IBM employee and others had given him false information concerning the system and school needs.

When he made public his request for another vote, he was told it was too late.

Valid Vote?

But when Frank was asked to justify his recommendation, he said the intent order was not final and not binding, implying the vote didn't carry much force.

The latest equipment, he noted, was needed to assure that the vocational students would be able to compete successfully for jobs in 1976 when they would graduate.

He pointed to his own experience – working on 360/40s – and indicated that students would have an edge in the competition if they could say they had worked on the latest system.

He was supported in this contention by the former IBM employee, who stated he was not going to permit students to be trained upon "old" equipment.

When this explanation brought only renewed public criticism, another justification was presented – the 370/135 provided a "multidimensional atmosphere" and could be used for other tasks in nearby towns that would justify the cost.

This argument lost some of its force when the treasurers of the nearby towns stated they did not want to spend so much money on the vocational school.

Again several local citizens questioned who would do the programming for the "service bureau-type" operations. Further, they asked whether the committee had initially intended the 370 to be used in this manner and whether it had investigated hiring programmers, analysts, etc.

After explaining that the computer could be programmed by two teachers and the students, the committee said it did not want to hire professionals immediately to develop programs, and then get the equipment to support them since it would be years before any actual training could be handled.

Finally, a special open meeting was held in which the committee agreed to stop procurement of the IBM machine for the present and to go back into session for further consideration of the matter.

Down to the Sea in DP

PROVIDENCE, R.I. – A submarine on patrol in the Atlantic reels under the buffeting of an underwater explosion. Water floods her compartments and she dives, out of control, her hull crumpling under the intense pressure.

Catastrophic as it may be, this event does not receive news coverage, because it is simulated at Brown University's computer center under the direction of a visiting associate professor of engineering, Dr. Robert E. Nickell.

Nickell commits his theoretical mayhem by constructing mathematical models of various structures to study the effect of catastrophic conditions on design.

One of the problems Nickell has been working on is the stress factors involved with increasing the size of U.S. Navy submarines. "When you are trying to design a bigger sub, you just can't scale up the dimensions of existing submarines. If you did," he explained, "what was formerly a safe feature of the structure might fail."

Brown University is not designing submarines, he said, but is developing guidelines and techniques for industry to follow in various design processes.

For example, the guidelines developed by Nickell and his associates are used to design safety factors which enable a submarine to survive depth charges or other unforeseen attacks.

"There are several forces working together or against one another," Nickell noted. "All these variables are considered in the models we feed into the computer," an IBM 360/67.

Xerox Says No to Independent Add-On Memory

(Continued from Page 1

maintenance on purchased systems which include independent memories.

The letter added that these were the terms of its "standard maintenance agreements." Asked whether a non-standard maintenance agreement might cover systems with independent add-ons, a Xerox spokesman said the company had no further comment.

But the exclusion of maintenance support would probably apply to other independently enhanced systems now covered by Xerox support, he indicated.

While the user ponders his dilemma, Signal Galaxies has written a letter to the XDS user group pointing out the Xerox position "is sufficiently in contrast with the current industry-wide practice for the addition of both plug-compatible memories and peripherals."

The Signal Galaxies letter spells out the interfacing used to attach the add-on memory and adds that all connections and cables meet XDS specifications, while some of the cables and connectors were supplied by Xerox.

The memory attaches to the Sigma 5 and 7 CPUs using AT-11 boards and they are no different from many existing foreign peripherals now attached and supported by Xerox, according to Mark B. Lyon, Signal Galaxies director of marketing, who wrote the letter.

The independent supplier "has gone to great lengths to provide a totally compatible cost-effective memory unit," Lyon said. The letter added that the Sigma systems are "well conceived and well designed" and said that Xerox's present position is based on a "misunderstanding of our technical approach . . ."

The XDS User Group has not yet formally considered the Signal Galaxies letter, according to Dr. Walter Dietiker, president of the organization. The matter came up briefly at the December meeting of the group but few of the 1,000 members have yet been affected, Dietiker said.

If the group becomes concerned about the situation, a formal position might be issued, the president said. A survey to poll members on the matter might be taken after an executive board meeting in March, he added.

Meanwhile, Signal Galaxies is considering further legal action including a restraint-of-trade claim with the Federal Trade Commission. While the West Coast user is apparently the first to be threatened with revocation of his maintenance, several others are adopting a wait-and-see attitude, according to Lyon. About five add-on memory customers have indicated they would sign up if Xerox modified its position, he said.

There may be another reason why few Xerox users have complained. Many perform their own maintenance in-house and therefore are unaffected by Xerox maintenance pronouncements, Dietiker said.

While the potential savings with the independent memory is significant to users, Xerox does not have the same operating constraints imposed on it that affect IBM and its Justice Department consent decree. Therefore it may be on firm legal ground in refusing maintenance. But Signal Galaxies appears determined to bring the matter to a showdown implying that the Xerox stand has hurt both its own product and potential users.

Universal Interface Vetoed, Standards Favored

(Continued from Page 1)

necessarily in small detail.

"The differences, although electronically trivial, still prevent the computer customer from achieving the benefits associated with interchangeability of tape units.

"Similarly, this unnecessary engineering variation in interfaces requires peripheral manufacturers to alter functionally equivalent peripheral units for each CPU to which they are to be connected. This drives up peripheral prices or decreases competition, or both," the report stated.

Creativity Stifled?

Although some mainframe makers have indicated that standardized peripherals might hold back innovation, "the threat of the supposedly harmful effect of standards on creativity . . . may be overstated as a means of market control by CPU manufacturers," the NBS group found.

"Federal interface standards of limited functional applicability, taking into account the interests of the federal customer, will be in the public interest and will not hinder innovation in computer architecture," the study stated.

In order to develop guidelines for peripheral equipment and to test it with the interfaces, the report suggested the establishment of a new federal facility:

- "To develop appropriate performance criteria for evaluating and selecting components [peripherals] at defined system interfaces.
- "To evaluate and test interchangeable peripherals against stated minimum performance parameters.
- "To provide assistance to federal agencies in achieving increased component [peripherals] interchangeability."

Such a federal test center is needed, the report said, because users need "to insure that there is no loss of useful system processing capabilities," when buying independent peripherals "and that the selected peripheral components are comparable or better in performance than existing components.

"It appears that, to date, the integration of multiple-source peripherals into computer systems has proceeded without degradation to systems performance. In fact, in some instances, there have been reported increases in system performance, particularly magnetic tape subsystems replacements or additions," the report said.

In addition, the report urged the government to take a more active stand in promoting national and international interface standards for peripheral equipment.

Routine NCIC Check Nabs Murder Suspect

WEST MEMPHIS, Ark. – Two policemen and a computer terminal here teamed up recently to nab a murder suspect.

The suspect was stopped on suspicion of drunkenness, but the patrolmen made a routine National Crime Information Center check using the computer terminal recently installed at local police headquarters. The check revealed the suspect (or someone with the same name) was wanted for murder in Chicago.

A subsequent exchange of fingerprints and pictures between the two police departments confirmed the suspect was the wanted man.

The suspect was then formally charged and taken to Illinois where he will stand trial for murder.

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Optical Systems Eye-Openers

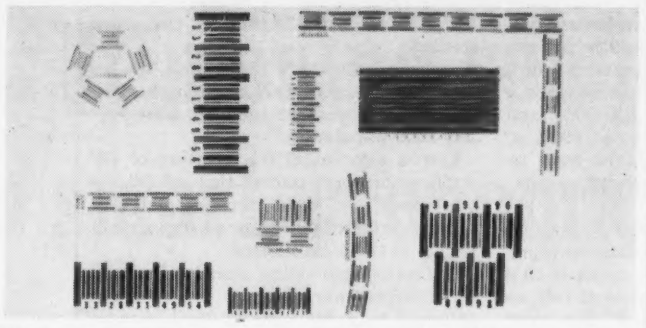
NEWTON, Mass. – Optical technology is providing state-of-the-art solutions in both the point-of-sale and data communications fields.

The grocery industry has been working to speed the checkout of items in a supermarket by developing an optical marking system that can be scanned for identification and price by the register clerk.

Several prototype tests of optical scanner and coded marking systems are now being held. Among these systems is the Pitney Bowes-Alpex Supermarket Electronic Scanning for Automatic Merchandise Entry (Sesame) which is installed at the end of a checkout counter and reads a linear bar code in several densities.

In addition to speeding the checkout process for customers, the scanned data is processed by a minicomputer or other processor to give grocers closer control over inventories.

The American Stock Exchange is transmitting stock transaction data in downtown New York using an infrared communications system called Optran. Located on the roof of the exchange, the optical system makes it unnecessary for the exchange to depend on underground cables provided by the phone company. The Optran system from Computer Transmission Corp. operates at 5,400 char./sec to transmit data to a pair of 360/40s two blocks away.



These are some of the formats possible with Codabar from Pitney Bowes-Alpex.

Stock transactions are transmitted to a nearby CPU using Computer Transmission Corp. Optran infrared system.

Pitney Bowes-Alpex Sesame point-of-sale system is shown at an "operating prototype" installation.

Holiday Planning Gets Quick Sendoff

LONDON – Holiday travel plans can be made in about three minutes with an on-line reservations system recently inaugurated by Clarksons here.

Caspar (Clarksons Automatic System for Passenger and Agent Reservations) has been developed over the past four years by Constructive Management Services, a Clarksons subsidiary.

The heart of the system is two Univac 9400s which can answer an individual inquiry in .8 seconds and completes an average booking in about three minutes.

Inquiries are handled by 120 visual display unit operators who receive 24,000 telephone calls per hour, mostly from travel agents. The computer displays what reservations have been booked, offering alternatives if the customer's exact requirements are not available.

Colleges Look to Sharing

LOS ANGELES – Three universities here are expanding their joint studies of potential benefits available to them through cooperative sharing of facilities and programs.

The University of Southern California, Caltech and UCLA are exploring the sharing of resources such as computing centers and libraries, in light of the financial squeeze facing the nation's colleges.

Registrar Says 'No Charge'

HANOVER, N.H. – The operation of colleges, like governments, always seems to become more expensive, but Dartmouth College administrators have found a way to provide for less than a nickel a service that once cost the student $5.

Registrar Douglas M. Bowen reported the $5 fee students traditionally paid in order to add, drop or switch courses within the five-day "grace period" following registration is being eliminated for the winter term under an experimental program.

By using a specially designed computerized registration program stored in the college's Kiewit Computation Center, however, changes by students can now be accomplished in a fraction of a second and for less than a nickel. The small charge for computer time will be absorbed by the college and the $5 savings passed on to the students.

The $5 charge will be applied, Bowen noted, if students decide to make changes in their schedule after the "grace period."

As each student enrolls in a course, the information is fed into the program and stored.

College officials using a terminal connected to the Kiewit Computer can ask the system which courses or sections are open or closed, which courses can accept additional students without overburdening the facilities or the professors, and what courses are available as alternatives for student selection.

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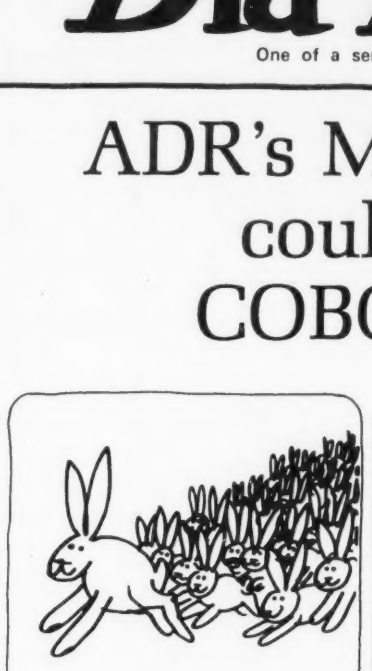

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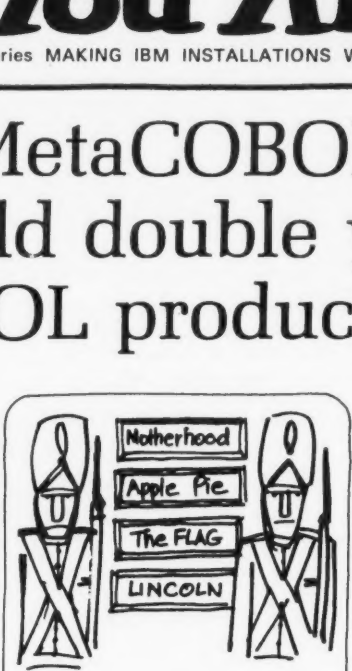
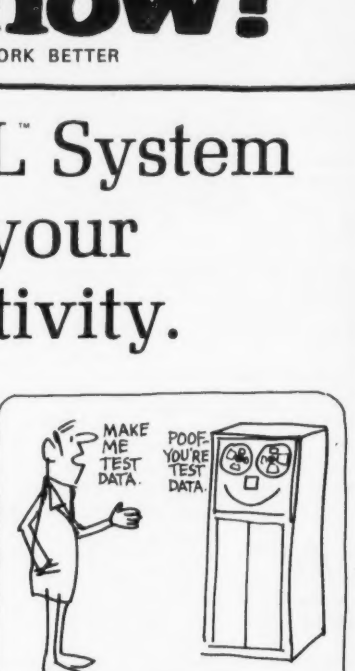


Allows installations to enforce their own COBOL standards.



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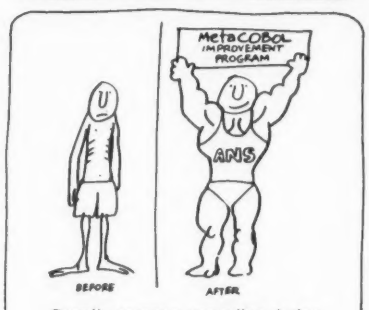

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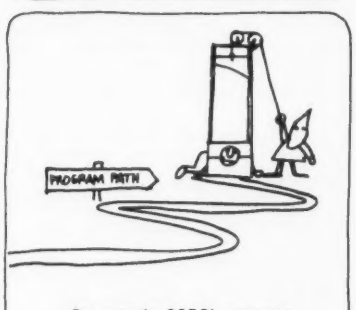

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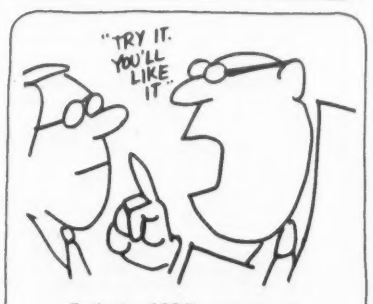

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Are You Getting Your $1.84 Worth?

ROCKVILLE, Md. – Cities, and counties in the U.S. spend an average of $1.84 on data processing for each resident of their jurisdictions, according to a firm here which is developing nationwide figures on DP expenditures in city and county governments.

Of the 257 responses to Keston Associates' first survey, the median expenditure of $1.84 per resident was equal to .9% of the total budget for the county or city surveyed.

The upper limit on expenditures was $2.50 per person in the jurisdiction or 1.5% of the overall budget. The lower limit was 75 cents per resident or .5% of the overall local budget.

By population it was found that in cities or counties with a population of between 14,000 and 50,000, 30% owned their own computer, 24% used a service bureau and 16% had some sort of cooperative or sharing arrangement with other jurisdictions.

However, as cities get larger, the proportion that uses strictly in-house computers rises. In jurisdictions with between 50,000 and 100,000 population, 65% have in-house systems; of those with a population between 100,000 and 750,000, 84% are in-house; and 100% of the cities with over 750,000 have in-house systems, the study showed.

Guess Who?

The most prevalent manufacturer represented in the local governments is IBM with 79 installations; Honeywell follows with 15 installations; and NCR is third with 11, followed by Univac, Burroughs and RCA, the survey found.

"The small computer systems are particularly prevalent (under $2,000/mo)," the report indicated, "with more than 40 in this category.

"Only 26 of the respondents use on-line terminals, with a total of 732 devices in these installations," the study said.

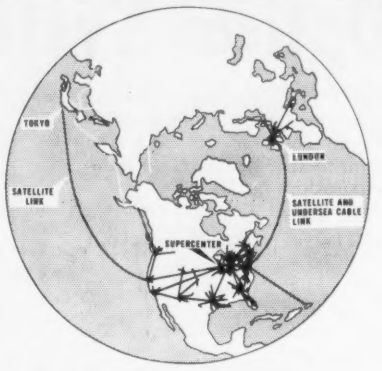
Expenditures for data processing were somewhat related to population size, according to the study, and ranged from $17,000 to $10,324,000 in the cities studied.

However, the study also noted "an interesting aspect of this trend is that expenditures appear to increase more rapidly than population."

Keston also found the "pattern of DP staffing closely parallels that of DP expenditures," with the range of staff size varying from a low of one to a maximum of 623 in the areas studied.

The major application areas for the local governments were financial management followed by public services. Next in order of applications in use were the public safety area, social services and management-planning applications, the report said.

The report is part of a continuing local government DP self-audit service available from the firm. With the service, Keston collected statistics on various expenditures by local governments so that participating cities and counties can measure their performances against national averages.



Global Net

GE plans to extend its Mark III remote-computing network [CW, Oct. 25] to Japan and Western Europe. The trans-Pacific link, expected to be in place by the end of March, will provide multi-national corporations with access to common data bases from locations spanning two-thirds of the globe. Initially U.S.-Japanese transmission rates will be 2,400 bit/sec, GE spokesmen said.

DP Aids 'Revolutionary' Study

LOS ANGELES – Using "barebones" records of the Massachusetts Legislature from 1744 to 1776, historian Dr. John A. Schutz of the University of Southern California is hoping computer analysis will shed new light on the American Revolution.

While a vast body of material, such as books, manuscripts, genealogical data, census material, biographical material and legislative records exists to provide input data, the problem lies in the absence of minutes and records of deliberations such as the present-day's *U.S. Congressional Records*, Shutz said.

"We hope, first of all, that the study will provide an explanation of the legislature as an institution.

Rising Revolution

"We also hope for probable explanations of the rise of the Revolution in Massachusetts, the nature of the colony's political elite and the rise of the Tories and Whigs," Schutz said.

"For example, by looking at the age, education level, region of constituency and frequency of chairmanship of committees, the computer can come up with information about leadership as it developed among certain legislators," he said. Input is being classified on three levels, beginning with a study of the 1,300 men who were in the legislature, their careers as they pertain to the town they lived in and their birth and death dates.

The second level includes problems of the constituency of each legislator, and its various kinds of characteristics.

Thirdly, Shutz is looking at the legislative record of the period.

Work is proceeding under a grant from the National Endowment for the Humanities.

	370/158J (1MByte)* 8-year term	370/145H (256K)** 5-year term	370/135GD (148K)† 3-year term
IBM rent/mo	$39,193	$27,105	$ 8,520
2-shift overtime	$7,839	$2,961	$1,705
Total IBM rent	$47,032	$30,066	$10,225
DPF price/mo††	$22,327	$19,698	$7,668
% savings w/overtime	53%	35%	25%
Savings/mo	$24,705	$10,368	$2,557
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*For CPU and memory alone without peripherals.

**For a system with independent peripherals compared to one with IBM peripherals including one 3330 subsystem with eight spindles; one 3420 subsystem with eight tape drives; one 2540 card reader/punch; one 2821 controller and one 1403 printer. The IBM prices are figured for the peripherals on an extended-term lease plan and are therefore lower than they would be on a straight rental.

†For a CPU and memory alone, without peripherals.

††The DPF prices exclude maintenance which is free for the first year.

Comparison of IBM, DPF Monthly Rentals

Lease Plan Promises Bonanza

(Continued from Page 1)

from IBM would be $47,032, DPF said.

The DPF price is almost $25,000/mo less than that IBM figure, and that amounts to over $2.3 million over the eight-year period of the lease.

Mixed-Bag Savings

In the mixed-system area, DPF said it could save the user 35% by supplying a 370/145 CPU with independent peripherals over a five-year period, as compared to the full IBM price for the equivalent system. The DPF leased system with the IBM CPU and the independent equipment will cost the user $10,000/mo less than the all-IBM system rented from IBM.

Over the five-year term of the lease the savings would therefore amount to $600,000.

Even on a short-term lease, the firm promises savings, stressing the user could save 25% off the monthly rental of a 370/135 CPU. That amounts to $2,557/mo or $92,000 over the three-year term of the lease.

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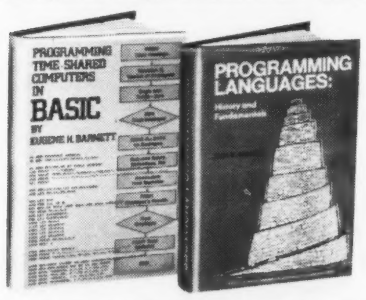

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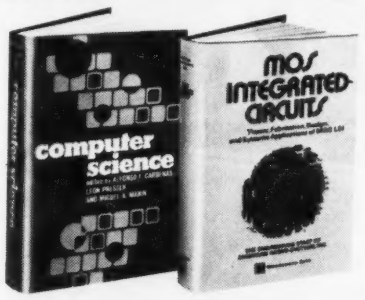

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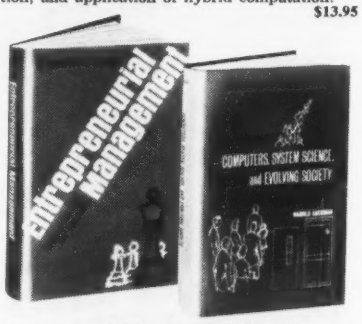

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Australia Net Users to Benefit

Special to Computerworld

CANBERRA, Australia – More than $6 million will be spent over the next three years on advanced computing equipment and buildings for Commonwealth Scientific and Industrial Research's Division of Computing Research, according to the Minister for Education and Science, John M. Fraser.

Negotiations are proceeding for the delivery of a Control Data Cyber 76 computer which would be coupled with the installed Control Data 3600 to increase the capacity of the Csiro network for large-scale scientific and technical computations.

The high-speed link would be carried out with minimum disruption to network users. Installation of the Cyber 76 would enable the organization to discontinue part-time usage of a Control Data 6600.

Together with the installation of the Cyber 76 at least 20 more communication nodes would be installed for Csiro divisions in metropolitan areas, away from actual city centers or in country towns.

Scientists and research workers in Canberra, Sydney, Melbourne, Adelaide, Brisbane, Perth, Townsville, Rockhampton and Griffith with access to Australian Post Office Datel services would use the network.

They would be able to draw not only on a computing system with the ability to execute an average of 15 million instruction/sec, but also on a set of technical data bases of massive proportions.

The Division of Computing Research has scientists engaged in systems development, simulation and modeling, data-base management studies, artificial intelligence investigations and statistical computation, together with services groups which support the network.

Technical and scientific computing services are also available to government departments, the largest such users being the Department of National Development and the Department of Primary Industry.

Gabriel's DP Band in the Sky

MACUNGIE, Pa. – If one assumes there is a heaven and that computer people have any chance of gaining entrance, there is a good possibility they will be met by musical strains of a Digital Computer Organ produced by Allen Organ Co.

The Allen organ is reportedly the first musical instrument to be awarded the Industrial Research 100 award given to the best 100 products introduced each year and is the first organ to use complete computer technology to produce musical tones.

The computer used is a time-division multiplexed parallel processor, which is similar to standard digital computers because it contains memory sections, performs arithmetic functions and uses conventional computer logic.

Internally more than 150 shift registers are used in conjunction with five random-access memories and several read-only memories to develop a trillion-trillion-billion note capability.

Circuitry is designed using large-scale integrated (LSI) technology so that more than 2,000 conventional integrated circuits, or about 50,000 transistors, would have to be used to equal the 22 LSI boards used.

Functionally, using the computer makes it mathematically impossible for notes to be off speech or out-of-regulation with note-to-note scaling throughout the entire range of the instrument flawless.

Options for the basic model allow the user to select from hundreds of additional voices by using punched cards with the card reader built into the console keyboard of the organ.

A transposer is included in all models to allow dynamic adjustment of keys and pedals either up or down a half step at a time.

Prices for Digital Computer Organs start at about $5,500 for a self-contained instrument of 36 straight stops.

Just Food for Thought

ATLANTA – A 4K PDP-8/L computer has been used in an experiment which conditions up to 256 rats to accept water in accordance with the condition of a light in their cages, before they are killed and their brains fed to a new group.

Training is accomplished by electrically shocking the animals if they attempt to drink water at an undesignated time.

The experimenters at the Georgia Institute of Technology first train a group of control rats to perform the drinking task, then extract portions of brain tissue from the trained rats to be fed to a new group of animals to determine if they learn in less time.

Caged Like Animals

Rats are caged in glass houses with a water fountain continually running next to an electric light. When the light is not on, an electric current is passed through the water so if the rat tries to drink he receives a shock.

The minicomputer is used to determine the ratio of "good attempts" against the "total attempts."

When this ratio nears unity, the rat is qualified as trained; he is then sacrificed and his brain tissue is fed to a new recruit.

With the system in operation more than a year, the university has been able to reduce the time needed to train rats from about eight days for normal rats to five days for brain-fed rats.

Paint Company Has 'Class'

Special to Computerworld

SYDNEY, Australia – Punctual delivery of special paints to automobile makers and industrial customers has always been an important objective of Dulux Australia Ltd. management.

Now several computer programs called Class (Capacity Loading and Scheduling System) help Dulux plant managers in Sydney and Melbourne set more realistic targets for special batch paints. The programs are run on Dulux IBM 360/30s.

Class programs also help managers achieve delivery targets by highlighting possible delays in production.

Many Finishes

The Dulux paint factory in Melbourne uses about 1,000 different raw materials and produces more than 6,000 different stock finishes. Over 400 batches of paint can be in the scheduling process at Dulux at any one time.

Scheduling is especially difficult because some processes take a lot longer than others. Tinting still requires a high degree of skill and patience and can take a long time depending on conditions in the plant.

Class was designed by IBM in Germany for metal-working job shops.

Big advantages

Checks for Backsliders

'Frat' Aids Methadone Program

SAN JOSE, Calif. – Santa Clara County has turned to a computer based system to check for backsliding among narcotics addicts registered in its methadone maintenance program.

The automated system capable of chemically analyzing more than 35,000 urine samples yearly pinpoints which addicts in the program have been using hard drugs – and does it approximately six times faster than the previous manual methods, according to Russ Stark, program coordinator.

The speed of the system means the county will be able to expand its methadone maintenance program "to keep pace with the urgent need with no increase in the number of lab technicians and no increase in laboratory space," he said.

The Free Radical Assay Technique (Frat) is used to check every sample from every patient. Samples that show a positive reaction (indicating the presence of hard drugs) are further analyzed.

The typical patient is required to give a urine sample about once every seven days, using a computer-generated random selection of the addicts in the program.

Results of each day's urinanalyses are returned to the clinic within 24 hours for use by the psychiatric nurses, addiction specialists and others operating the treatment process.

Frat Faster

Using older method (called thin-layer chromatography) to check for backsliders, each lab technician could perform approximately 75 test/day. But with the new technique the technician can perform around 420 tests daily.

The only major drawback is that each test with the Frat system costs 50 cents, while the tests under the older system cost only 25 cents in materials.

Frat can detect as little as one billionth of a gram of hard drugs or drug metabolites in the human body, according to its developer, Syva Co., a joint venture of subsidiaries of Syntex Corp. and Varian Associates.

The Santa Clara program presently has approximately 700 active patients with a waiting list of 200 additional addicts.

Lab technician Mick Guerrero inserts a urine sample in Santa Clara County's automated drug screening system. Results are displayed on the plotter in foreground.

Computer Increases Aussie Tax Revenue By Over $24 Million

By William Scholes
Special to Computerworld

CANBERRA, Australia – Not many businesses in the world can show a direct increase of over $24 million in net profit for the year just by installing a computer. But very few businesses have the advantages of the Australian Department of Taxation.

In the 1971-72 fiscal year, the Taxation Department brought to full operational level a new system for computer-assisted assessment of salary and wages throughout Australia.

The computer was programmed to make adjustments or take other appropriate action where the amount of a claim exceeded what had previously been proven reasonable.

In the annual report of the Commissioner for Taxation, Sir Edward Cain, commissioner, stated: "While the computer-assisted assessing system generally uses the same guidelines as the manual system it replaces, it has brought a degree of precision and consistency to assessing which could never be achieved under the former system."

Cain also cited the development of a highly specialized experimental data entry system designed for taxation processing and he called significant the completion of the first year of full operation of a pilot integrated data processing system.

The system, which has been installed in Adelaide as a model for the national taxation office system, is expected to come into operation by stages commencing in 1973-74 when a central computer complex for the taxation office will be installed in Canberra.

With more than seven million income-tax returns to be processed annually, an enormous volume of information must be fed into the system to make assessments, issuing refund checks and accounting for tax-installment deduction and payments by taxpayers.

Under the present data entry system, the information required is punched on paper tape, which is subsequently verified by a second punch operator and transcribed on to magnetic tape.

The information can then be fed into the computer system, which applies a complex series of edit checks designed to identify incorrect information and tape-punching errors.

IRS Publication Lists Groups for Deductions

WASHINGTON, D.C. – The Internal Revenue Service has announced publication of its first computer-produced list of organizations eligible to receive tax-deductible contributions.

The 843-page "Tentative Cumulative List of Organizations" described in Section 170(c) of the Internal Revenue Code is now available in most IRS offices.

The Tentative Cumulative List employs a coding system to identify each of the 131,000 organizations' foundation status as well as any limitations on contributions' deductibility.

The tentative Publication 78 is a product of the IRS computerized Exempt Organizations Master File as compared to the manually assembled Cumulative List of Dec. 31, 1970. Because of the nature of the initial computer-produced list, it is being published in tentative form to enable interested persons to inform IRS about omissions, misspellings, coding errors, alphabetical misplacements and other items believed to be incorrect.

Comments on the tentative list should be addressed to the Internal Revenue Service Center, 11601 Roosevelt Blvd., Philadelphia, Pa. 19155, Attention: EOR Branch, by Jan. 31.

s in small packages!

This new low-priced NCR Century 101 system offers small and medium size businesses the big kind of computer power they need to grow.

The newly released peripherals for the NCR Century 101 processor require a minimum of space, yet they provide the power and versatility of units twice their size.

The basic system, including processor, card or paper tape reader, line printer, and one dual platter disc unit covers no more space than 2½ feet by 10 feet! It can be placed in rooms where larger computers just won't fit. And, because it generates little heat, air conditioning requirements are minimal.

Big advantages in small packages include free standing add-on dual platter disc units, each having a storage capacity of 10 million bytes. A line printer that turns out 300 lines of crisp printing per minute. And an optional 30-character per second I/O Writer.

The 101 processor, heart of the system, includes features like a high-speed memory that can expand in practical increments from 16K to 64K. An optional multiplexor that provides control for 10 communications lines, with no increase in cabinetry. Seven-way to nine-way simultaneity. And many other features just as significant.

Later, as your business grows, you can expand this modular system to meet increased information requirements. Larger capacity disc units and higher speed printers can be added if and when you need them.

For the price, this new system from NCR offers big performance for businesses on the grow. Average systems range from just $1820 to $3800 per month!

Call your local NCR office for the specific advantages your business can expect from this newest member of the NCR Century family.

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Editorials

Dropping the Prefix

A decade ago the phrase "IBM manager" was still prevalent, even though the advent of computer systems from many computer manufacturers had broken the grip of IBM on data processing departments. Now the IBM prefix has vanished.

One development recently reported – the CHCS Accelerator for the 360/30 computer – presents the possibility of the dropping of a nearly universal prefix. The accelerator uses the microprogrammed facilities always present in the Model 30 to improve the system. It is still a Model 30, albeit an improved one. But it will no longer be an "IBM" machine.

The hardware design of the Model 30 has been the most successful yet. But users are entitled to the full capabilities of any machine. If IBM does not provide for the follow-on development of its systems, its choice should not be allowed to totally hold back effective system development as it appears that development of the Model 30 system has been held back. CHCS is appreciated – as will be any other developers of other cruelly abandoned computers.

. . . Even at the cost of having to again drop that "IBM" prefix from our machine names.

Christmas Always Comes

Christmas '73 may seem a long time away now, and not worth bothering about in our busy world – a time to remember our relaxations, but hardly a time to prepare for.

Yet it will come – and just when we are most at ease the time may come to show that preparation was most important. Such a time came in Sacramento last Christmas, when fire ravaged computer rooms in the National Guard and Department of Motor Vehicles headquarters.

The Californians had taken time to prepare. They had spent $1,200 on plastic covers, which prevented water damage to $15 million worth of equipment. There was no need after the holiday for those in authority to lament their lack of preparation.

Next Christmas, when you are relaxing, will you be able to feel as securely protected? It may not seem important now, but Christmas – and a general relaxation of precautions – always comes. So why not prepare today?

Innovation Would Be Aided

Protect Consumer, Break Up IBM

By Eric S. Fisher
Special to Computerworld

David E. Ferguson's article, "U.S. Needs IBM to Compete Overseas" [CW, Nov. 8], has many arguable opinions. Among them are:

- The small systems market was virtually nonexistent prior to the System/3.
- Univac would have little chance of competing with the six companies resulting from an IBM breakup.
- Peripheral manufacturers are going to continue to be profitable under a unified IBM.
- Unbundling is here to stay.
- Innovative products come from IBM.

To consider the above points:

- IBM's development of the S/3 was a response to the already rapidly growing small systems market. It was *not* the creator of that market. The fact that this market has grown even faster since its introduction is simply a reflection of the impact of IBM's marketing force once it is "unleashed" on a market.
- Why should IBM be broken into six parts? Why not seven or eight? And what is Ferguson's basis for assuming that Univac would not have much chance to compete against the resulting companies?
- As long as IBM has such a dominant position in the mainframe market, there is little chance that manufacturers of such high-profit items as disk drives and memories can long survive. In the past two years the industry has witnessed the following occurrences:
  - IBM has raised the prices of its CPUs (in which there is little competition) while lowering the price of its disk and tape drives, in which the competition is keen. In this way IBM's total revenue was largely unchanged while peripheral manufacturers have been driven up against the wall.
  - IBM has increasingly integrated peripheral controllers into the CPU, effectively lowering their cost and making it more difficult for peripheral makers to design compatible peripherals.
  - IBM has increasingly integrated main memory into the CPU, also making it more difficult for competitors to manufacture replacements.

While it is certainly not a crime to lower prices in the face of competition, IBM's policy to selectively raise and lower prices of system components to make the total substantially the same while making other companies suffer is not competition but monopoly.

Viewpoint

- I challenge Ferguson to come up with an estimate of how long it will take IBM to rebundle once the competition is smashed.

My own estimate is five years at the most.

- I think the whole tone of IBM's attitude to technological innovation was set in the early fifties when it lifted Univac's patents on basic computer logic circuits. Since then, I think it can be said that relatively little innovation in computer software or hardware has been initiated by IBM.

To imply that breaking up IBM would hamper technological innovation is to completely ignore the facts.

To say that IBM does not have effective competition for mainframes because there are no large competitors is to indulge in circular logic.

Certainly the U.S. will experience increased competition from computer manufacturers abroad. If the U.S. companies wished to form consortia for marketing U.S. computer technology abroad, I'm sure the Justice Department would have no objection.

In short, I think the breakup of IBM can be accomplished equitably and skillfully. It would stimulate rather than hamper innovation and even further improve our trading position. Thus, the best way to protect the consumer is to break up IBM!

Fisher is director of data processing for a small agency of the Michigan Department of Mental Health.

Letters to the Editor

Esperanto Not English? Good Luck to You

The letter by James J. Pottmyer favoring Esperanto over English as a documentation language [CW, Dec. 13] is certainly a much larger project and involves more people than advocating a change in emphasis of computer programming languages (from Cobol to –). I admire him for his enterprise. I agree with his analysis of English and wish him luck in his endeavor.

If he is as persistent as are a great number of professionals in their demands in computer programming language development (scrapping Cobol), who knows? After all, look what metrics has done to feet and pounds!

Thomas H. Politowski
Director of Systems and Computer Services
Resource Control, Inc.
Lansing, Mich.

Be Broad-Minded!

Re: Dec. 20 issue, Giff Babcock's letter.

Isn't it just amazing how people can get their mental exercise by jumping to the wrong conclusions? Equally amazing is how the same people want others to join them in their jumping.

Is Babcock a real person? Is he really concerned about professional attitudes of all DP managers or just his own uncertainties? What is his definition of professional? Perhaps a definition might provide a better balance between his opinions and reality.

Or is Babcock really attacking IBM? IBM undoubtedly has many sound business principles; they have made and have sustained themselves as a leading company. However, there are innumerable individuals and personalities who make day-to-day customer contacts who make impressions their own way.

Also, the interactions of customer personalities are equally innumerable. Combining the entire IBM organization into a very, very narrow description as Babcock attempts to do is transparently fallacious.

Robert R. Hamilton
Past President
Boston Chapter, DPMA
Boston, Mass.

Friends up North

Re: stalled satellite editorial, CW, Dec. 13.

Yes, there is a Canadian communications satellite which can be used by our neighbors to the south for a price. Yes, it was launched in Florida and I am sure that American expertise was at least a basis to build on.

But, rather than an "I am first" or a "me too" approach, why not a "use what we have available and when more or better is required or available, enlarge or upgrade"?

Your editorial reeks of the "American Chauvinistic Attitude" – that there is none better on earth than we. The third paragraph of you editorial – "The absurdity of the current situation is clear: we may have to pay foreigners to use a satellite that was launched by our own expertise in Florida" – only strengthens your image.

Yes, I am a non-American, but there is definitely a better grade 4 word than foreigner – try friend, associate, comrade, Canadian, etc.

B.L. Nicholas,
Systems/Analyst
Toronto, Canada

You overlook the fact that *Computerworld* also cited the "commendable display of cooperation with our neighbors to the north." Rather than downgrade the Canadian effort, we intended to applaud it and instead call attention to the folly of our slow governmental procedures. Ed.

Billing Controversy Brings Out Choice for Computer Community

Computerworld is written for the computer community and says so on the front page of every issue. When letters are received for publication, therefore, whether they go to the editor, or are sent to me as a columnist, it is expected that the writers are interested in communicating some information they think is important to the community.

The Taylor Report
By
Alan Taylor, CDP

Personally, I find these letters very interesting, particularly the ones that take issue with the column. Almost all help me, by either reminding me that not everyone regards computers as the center of the universe, or they bring out a distinction which I had not made in the column. (Even in a column it is impossible to cover every aspect and distinction of an issue without losing the reader's attention).

The letters help me understand a little more about the computer community – and I welcome them accordingly.

Occasionally, however, the letters leave me at a loss. This loss occurs when two readers have well thought out philosophies regarding community interests that are mutually incompatible, yet both are able to cite facts and arguments in their own favor.

Sometimes the disagreement can be solved by analysis – but sometimes the answer can be found only by putting the question to the community itself.

Such a case occurred when Mel Tolhurst's philosophy on computer billing was published in this column on Dec. 6, and Otto Almasy responded on Dec. 20 with an equally self-consistent philosophy.

The Two Philosophies

Tolhurst believes the billing dates printed upon computerized bills should be accurate – at least before the computer system proceeds to sock him with finance charges of 1-1/2% on the current month's outstanding balance.

Almasy, however, believes the accuracy of these dates is unimportant, as they are simply internal controls and not of any concern to the recipient. Moreover, he feels the potential cost of adopting the Tolhurst-type of computer billing could be too high to give it serious consideration.

Almasy has a point which should be heeded. Relieving Tolhurst of those finance charges when the billing date is inaccurately recorded by the computer system could be costly.

The Tolhurst system is based upon the assumption that bills which have 25 days between the accurate billing date and the time finance charges are imposed can be handled by paying all bills at least every 16 days. (Tolhurst pays his on the first and the 15th of every month.) Theoretically, this leaves nine days for two-way mailing when the bills are mailed on the billing date.

When the computerized billing system mails the bills a week or so later, however, the payment system can break down. Payment is then made about three or four days after the deadline, resulting in finance charges.

The cost Almasy is referring to is presumably the cost to the firm of accepting the responsibility of keeping the billing dates accurate, or else of extending the finance charge deadlines accordingly. This could be costly for them, for it could cause them to lose some extraordinarily profitable transactions in cases like Tolhurst's.

Currently, Tolhurst is paying a real interest rate of 80% on a finance charge that is nominally described as being 18% annual interest in conformance with the truth in lending laws. This is because the 1-1/2% finance charge is levied for under one week's extension of credit.

(Only time after the deadline is involved. Other charges are used to pay for the credit up to that point – and you can be sure that the charges are not calculated to leave the vendor losing money if the customer pays on the deadline!)

The 18% rate is accurate if and only if the customer does not pay up for another four weeks.

You can quickly see that being assessed charges equivalent to 80% annual interest on any appreciable balance will be a very profitable business indeed.

Whether or not this is a general occurrence I do not know.

Almasy's letter seems to indicate that there is a significant amount of potential loss in eliminating this billing practice. He is in a better position to know the figures than I am, as he is the director of services and systems at Transamerica Insurance Group, so let us assume the potential loss is significant.

There are in fact high costs involved in seriously considering Tolhurst's complaints. But even though Almasy's facts may be straight, the facts do not necessarily support his conclusion. His conclusion is that because of the cost serious consideration should not be given to clients' habits.

Now does that really follow? The fact that the accurately dated billing application is not quite as profitable as one with inaccurate billing dates may be true, but is that important to the computer community?

Computer Community Involved

The computer community could lose by going along with the Tolhurst philosophy. Indeed, if the incidence of computer applications which need to use inaccurate billing dates to be economically justified is at all high, the community could lose out by giving serious consideration to the problems – for the evidence that would be unearthed by such serious consideration would effectively force these applications to close down.

The community could lose some jobs. The hardware manufacturers might lose some sales – and they and their employees are also a part of the computer community.

But again is this important to the computer community?

This philosophy has some very strong supporters. The ethical codes of some of our professional societies are very explicit about the "professional" requirement of loyalty to the employers' interests, but remain wishy-washy about any professional loyalty to the accuracy of information.

The same "professional societies" have shown a pattern of not getting involved in matters of data accuracy that could offend computer owners. Good cases for this philosophy can be made.

Yet, before we agree with such a philosophy and sweep our clients' complaints under the rug, let us ask whether we have completed the computer community balance sheet.

Certainly we have provided for reasons why we should not listen to the clients' complaints, and why they would be costly in jobs and profits – but there are equivalent costs involved in ignoring them, namely suggesting – as Almasy did – that Tolhurst should shop elsewhere.

We have tried evading clients' complaints for a decade and now we find that the public has lost confidence in our integrity.

This loss of confidence is the price the computer community has had to pay, in order to obtain the dubious benefits of keeping a few, marginal applications afloat. This loss of confidence must be weighed in the balance – before what I see as the Almasy philosophy is accepted.

As I mentioned in the beginning, the Almasy rebuttal of the Tolhurst philosophy gave me a problem – because they suggest to me two basically consistent philosophies, either of which the computer community could espouse. Yet these two philosophies are incompatible, with one providing for accurate data to be the overriding goal of computers, while the other urges maximizing the continuation of today's job opportunities.

I know what my philosophy is but I do not know the philosophy of the computer community.

I would like to know and so would many others. To help you register your opinion there is a coupon for you to state your feelings.

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What Is Your Philosophy?

Where billing dates are used by computerized billing systems to assess finance charges:

They need not appear on the customer's bill as they are only internal controls. Yes No

They should appear on the customer's bill, and should be close to the date upon which the bill is mailed out. Yes No

Other Comments _____

_____

_____

The data processing profession is entitled to refuse to give serious consideration to allegations of abuses of the public (such as providing inaccurate information):

When ignoring the allegations allows DP users to make more money. Yes No

When ignoring the allegations allows DP practitioners to get more jobs. Yes No

Under what other circumstances do you feel the DP profession is entitled to refuse to give serious consideration to allegations of abuses relating to computerized systems? _____

_____

_____

When completed please return to Alan Taylor, Computerworld, 797 Washington St., Newton, Mass. 02160. If you wish to fully or partially complete the following personal details it will assist in evaluating your response.

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Privacy – Common Ground Needed by All

Viewpoint

By E.T. Dibble
Special to Computerworld

In most discussions about privacy that I am aware of one point is obvious. Most people on both sides of the issue are sincere in their arguments. But there is one question which comes to mind. Why not work together to formulate legislation which will assure the privacy of the individual and also allow valid processing requirements to be met?

The issue of privacy (at best a nebulous term) seems to be centered around the issue of accountability. On one hand there is fear that a person's activities record, known at one location, will be compared or combined with the information available at another.

On the other hand, those responsible for accounting are concerned with the requirement to debit/credit information, from various sources, in a valid manner. In the final analysis both "hands" probably should work together.

Common business discipline requires an accounting system which will allow credits to equal debits. Over a period of years it has become common practice to assign a unique number to a specific account.

Within a company the practice is to use the same chart-of-accounts number for the same account, even though various offices of the company are involved. In this way "cash" is recognized as "cash" by the parent company although it may be in banks at many locations.

The people charged with processing data look for an easy method of assigning a unique identifier for the application being implemented, in order to properly process (debit/credit) the system's data.

The reasons for using a common number within the same organization have long been validated. Therefore, rather than reinventing the wheel, many system analysts have made use of the Social Security number for deriving the unique identification required. This has obvious advantages and disadvantages.

At this time there seems to be little cross-referencing of information based upon the Social Security number, except by agencies concerned with money transactions. An example is the recent situation in a large state in which fraudulent welfare payments were uncovered by comparing Social Security numbers on the welfare payment and employment withholding records of the state. When questioned about this apparent invasion of privacy, one person mentioned, "no one has the right to cheat."

From a realistic point of view there is more than one type of privacy. Therefore, one of the necessities is to define the meaning of privacy in specific rather than emotional terms.

Perhaps one answer to the dilemma is to develop industry standards or guidelines Rules could be formulated about the type of information to be gathered, who would collect it, use it and have access to it.

In conjunction with a recommendation

(Continued on Page 12)

Cobol Validation: What System Can Best Serve Users?

By Ned Chapin
Special to Computerworld

At the last Fall Joint Computer Conference, George N. Baird reported on the Department of Defense (DOD) Cobol compiler validation system (CCVS). Those who heard him or read his report in the FJCC *Proceedings* were left with several impressions:

- The system is big. It consists of more than 50 programs composed of more than 120,000 lines of Cobol source code.
- To use the system to check a Cobol compiler for conformance with the Ansi Standard requires the person who sets up the job to have an extremely detailed knowledge of the Cobol standard.
- Adapting the CCVS to meet different object computers and different operating systems requires a lot of preparatory work.
- Repeatedly testing any specific Cobol compiler version and release made by a vendor will be redundant. Someone needs to check each compiler thoroughly once for each applicable object computer and operating system combination.

But the computer user does benefit from a CCVS in three ways:

First, program portability is improved. A source program compiled for different object computers should result in object programs that give the same results upon execution.

This is most critical for multi-installation users such as the Federal Government, and companies with branch offices. Even the single-installation computer user benefits when he has to use backup facilities.

Second, the availability of a CCVS should enable users to get Ansi Standard Cobol compilers that have fewer bugs. This saves trouble and builds confidence for the user, and saves the waste of programming around the known bugs.

Third, personnel efficiency rises. When the compiler can be relied upon to work the same way each time from computer installation to computer installation, personnel efficiency is helped in several ways.

The changes the programmer needs to be aware of are only changes in the

Viewpoint

standard itself, except for the presence or absence of specific features, such as the Report Writer.

Cobol expertise gained at one installation with one object computer can be transferred to other work with confidence. This transferability reduces start-up and training costs for the employer, and reduces training time for the employee.

One of my initial reactions to Baird's report was "I would like to play with the CCVS just for the fun of it to check out a compiler for my own shop." But as I reflected on the personnel and computer time needed, I concluded that no user should have to check Cobol compilers for conformance with the Ansi Standard.

The user should be able to rely on the vendor to deliver a standardized compiler. But for well-understood reasons of prudence, it is always desirable to have the vendor's claims checked by some disinterested user-oriented party.

Here are some choices for such a party:

Neither the American Federation of Information Processing Societies (Afips) nor the American National Standards Institute (Ansi) have the personnel or the computer resources or the knowledge of the standard, to operate a CCVS successfully.

The Computing and Business Equipment Manufacturers Association (Cbema) has access to the personnel, the facilities and the knowledge needed, but this would put validation into the hands of a vendor-oriented group rather than a user-oriented group.

The DOD – a major computer user – could do the validation through its Navy Programming Languages Section.

But it is unfair to expect any one user, however major, to bear the expense of operating a CCVS. To check all the compilers for all the major applicable computers and operating systems would take months.

Ideally, therefore, the party who operates the CCVS should be close to the standards effort, be user-oriented and be paid from the public purse, or by the equivalent of a tax or "validation fee" on the vendors.

The prime candidate for this role is the National Bureau of Standards' (NBS) Center for Computer Science and Technology. The Brooks Bill (PL89-306) would give the authority to select NBS, but provides no funds to support the effort.

If NBS should delegate the actual performance of the Cobol validation to DOD, and DOD to the Navy, this would leave the effort where it has been centered all along. And this chain of delegation seems likely to occur.

If it comes to pass, it leaves unanswered three questions significant for the Cobol user:

- Will DOD be able to tap the public purse to pay for a sufficient level of personnel and facilities to do the job well? The Navy is currently footing the bill. The temptation for DOD will be to ask the Navy to continue to pay, which would be unfair.

Even DOD itself should not have to pay by diverting funds from other efforts. How about asking the vendors to pay a service fee?

- Can NBS serve the Cobol users outside the Federal Government? It could, if it gets an adequate flow of validation results in timely and usable form, and then publicizes them.

Will NBS have the staff to do the job? Ruth Davis and others at NBS mean well and try hard, but since her staff is already loaded down with other tasks, what can we public users expect?

- What can users do to make our desires and needs known?

Ned Chapin is a data processing consultant, Infosci, Inc., Menlo Park, Calif.

Common Ground Needed by All

(Continued from Page 11)

for a national chart-of-account numbering system for welfare payments/services it was also recommended that legislation should be passed to assure the privacy of the individual.

This is particularly true since it is Congress and the taxpayer who ask for an accounting related to tax money spent. As a means of using the computer to assure the privacy of the individual it might be well for those advocating a particular position to work together as an ad hoc committee, under the auspices of a congressional group.

Without a common ground to work from, each side will expend a vast amount of energy and effort in the cause of "right," and may very well be no nearer a solution. Working together might bring out overlooked details which could lead to recommendations for congressional action.

Those willing to work or comment on this subject may contact me at 689 Longleaf Drive, N.E., Atlanta, Ga., 30342.

E.T. Dibble is a management system consultant.

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Random Notes

IMI Offers Free 'Preview' Of Revised Cobol Impact

SAN FRANCISCO – IBM 360 ANS Cobol users can determine the impact of the proposed revised Cobol standard on their programs, through use of a free diagnostic package from Information Management Inc. (IMI), 447 Battery St., 94111.

The Preview package reads Cobol source programs and issues a diagnostic for each statement. The messages show whether the statement is in both the current and revised ANS Cobol, in the current but not the revised, not in the current but in the revised, or not in either standard.

Basic for Datacraft Units Includes Matrix Operators

FT. LAUDERDALE, Fla. – A reentrant version of the Basic interactive language is available from Datacraft Corp. for use on its 24-bit computers. The processor is supported by the company's Disk Monitor System, a spokesman noted.

This implementation of Basic includes several enhancements beyond the original Dartmouth language, including a range of matrix operators and a computed GO TO, triggered by an ON condition test available with several instructions. The Datacraft Basic may be purchased for $500 from P.O. Box 23550, 33307.

ITT Data Opens New Office

NEW YORK – ITT Data Services has opened a data center in the financial district to provide subscribers of the company's Statistical Analysis from Remote Terminals (Start) service with faster turnaround on long print runs.

The center, at 25 Broad St., includes a high-speed remote job entry terminal with line printer. Users can enter jobs from the center's terminal or from their own, with output directed to the high-speed printer. ITT Data Services is based in Paramus, N.J., at Route 17 and the Garden State Parkway, and can be contacted through P.O. Box 402, 07652.

Orders and Installations

ST. LOUIS – Rohm and Haas Co. of Philadelphia has ordered the Compaid system from Monsanto Enviro-Chem Systems Inc. The $80,000 system, to be installed on a 370/165, produces isometric drawings of piping systems, prepares order documents and bills of materials, and generates various management control reports.

– – –

PRINCETON, N.J. – National Airlines, Amtrak, Consolidated Edison of New York, Hertz Corp. and Western Airlines are planning to install the Star telephone administrative system from Applied Data Research Inc.

Guide Lists Possibilities

Planning Seen a Must for Effective MIS

By Don Leavitt
Of the CW Staff

PHILADELPHIA – Users are justified in their confusion over the diversity of software products all labeled "management information systems" (MIS), but many of these are valuable enough so that users should not despair without an orderly review of what is available, according to Prof. James C. Emery of the University of Pennsylvania's Wharton School of Finance.

In a preface to a catalog of offerings recently compiled by Time-Sharing Information Services, Inc., Emery noted that the relative ease of use and low entry cost of time-shared MIS packages permit an organization to experiment with several of these decision aids and gain experience in their use before making any major commitment.

But experimenting on a hit-or-miss basis, even with well-developed systems, is only part of a step-by-step process that should be followed to make sure an MIS implementation is a success and not a dismal failure such as that which marred the MIS image in the late 1960s. And experimental use of a system should not normally be the first step in the process, Emery warned.

What Does User Want?

Look inward first, he urged. The user should never implement a modeling tool with the idea that it is bound to prove something useful. The potential user should spell out in advance, as well as he can, the information he would like and its relative importance to him.

Only after that self-examination should the user determine what decision packages are available, and then examine the most likely candidates in depth, Emery said. The examination should include a close study of the vendor's documentation, benchmark or trial runs of the model and discussions with some users of the package.

On the basis of such an examination, the user can decide which packages, if any, meet his needs.

The interactive nature of many MIS is justified more because of the rapport between decision-maker and model, than for any critical need for working with absolutely current data, Emery noted.

Once the initial examination is completed, users should negotiate with the vendors to determine as closely as they can what the real costs of using each system will be. Only after that, Emery said, should the user install and test, and then fine-tune the system to his particular needs.

Emery's discussion of how to plan for using MIS packages is followed by quite detailed descriptions of some 56 separate MIS or MIS-related offerings from time-sharing and package vendors. The write-ups all follow essentially the same format, making cross-package comparisons easier.

In any case, the vendor contact and phone number are provided. Copies of this $28 "specialty volume" can be ordered from 3401 Science Center, 19104.

'Pride' Defines, Controls Work Of Analyst, End User in System

CLEVELAND – The Profitable Information by Design (Pride) package from M. Bryce & Associates Inc. (MBA) does exactly what a good systems analyst should do to plan a project. But that, according to one user, is exactly why it is so useful.

Pride is quite literally a package, consisting of several manuals, an initial supply of documentation forms and training programs for both the analyst and the end-user department. The company also provides consulting service and guidance in the use of Pride, and any updates to the manuals.

Pride is not software, MBA explained, but rather a methodology that leads to effective software programs that make up easily maintained systems.

The manuals, and related forms, impose a development pattern on the analyst and require the involvement of the end user, in defining needs, okaying proposed report layouts, etc., all along the way. Followed faithfully, the system prevents the user, and analyst, from leaving out anything significant, MBA claimed.

Under the Pride methodology, for example, the analyst is prevented from going on to a new phase of a project until the whole current phase has been completed and "signed off" by the end user. Documentation is generated while the project is in progress, not after completion.

Pride provides "maximum and understandable" communication between all system developers, MBA said, and users agree.

At first the volume of documentation required seemed overwhelming, a user with a year's experience said, but the amount of detail provided in that volume proved invaluable in program maintenance after the project originator was no longer available.

The approach is independent of machine on which the system is to be installed, or language in which it is to be written. It is concerned with the management of the project, the system and the data within the system, allowing technical personnel to concentrate on creative design rather than administrative details.

Pride is available on a "per systems group" basis, at $8,000 for the primary installation, and $5,000 for secondary sites. It is also available for unlimited use within a corporate structure for a one-time lease price of $40,000.

MBA can be reached through P.O. Box 15459, 45215.

Packages Watch Daily Cash Flow, Organize Monthly Consolidations

HUNTINGDON VALLEY, Pa. – Corporate officers using large-scale 360/370 CPUs can get a better grasp of their company's financial status with a pair of packages from Kidde Computer Services Co. (KCSC).

The new Cash Management System (CMS) enables users to watch their cash flow at multiple locations, and the updated Corporate Consolidation Program (CCS-IV) provides a consistent approach to summarizing multidivision or location financial statements.

CMS prepares, on a daily basis, cash flow reports, cash receipts and transfer registers. Weekly, it provides a cash projection for 10 weeks.

Each month, CMS prepares bank reconciliations, ranking of subsidiaries and divisions, and a statement of intercompany loans. A variance report shows actual cash compared to forecast position, for the corporate as a whole and for each subsidiary.

The consolidation package is tailored for each use by user-specified parameters. Its use for mandatory Security and Exchange Commission (SEC) "10K" reporting is also applicable to monthly consolidations and closings, the company said.

The system contains an editing function and provides comparative reports, matching actual experience to budget for the current reporting period, or for year-to-date, or matching this year's experience to last year's.

Both systems are OS oriented. CMS requires 110K bytes of core, two disks and eight tapes, the company said. It is available for a one-time charge of $20,000 or for $500/mo.

CCS-IV utilizes 120K bytes of memory, one disk and three tapes. It sells for $5,500 or $200/mo, KCSC said from Red Lion Road at Philmont Ave., 19006.

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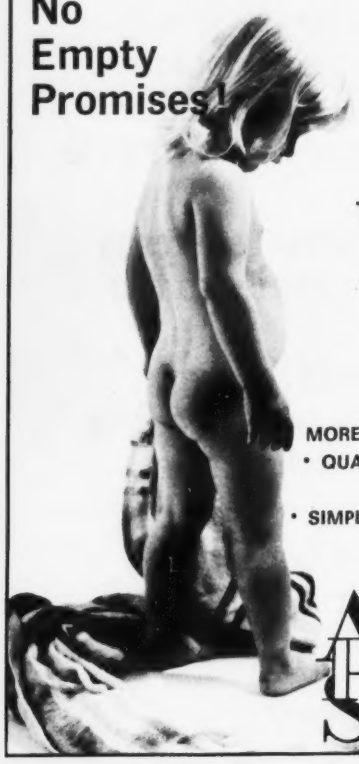

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360 Programs Shifted to PDP-11

CHICAGO – With help from Conversion Software Services Corp. (CSSC), users of DEC PDP-11 minicomputer systems may be able to install programs on their equipment that were originally written for IBM 360/370 CPUs.

A CSSC translation service accepts 360 Assembler source code and converts it to PDP-11 Assembler source code. Most versions of 360 Assembler are acceptable, although Assembler H macros cannot be handled effectively with the current implementation, a CSSC source said.

More User Opportunity

This service appears to open several doors to users. Installations with nothing but PDP-11s can now consider packaged software for the 360, from indepéndent software houses, as a means of extending their application workload "immediately" and without heavy program development effort.

Shops with 360s near the saturation point can shift some of their load to the lower-priced DEC gear, at least delaying what might otherwise seem to be an unavoidable mainframe upgrade. In this case, the user also gains PDP-11 system features not available on the 360, the CSSC spokesman noted.

Apparently the only limitation on the use of 360-oriented software on the PDP-11 (assuming the original programs are in Assembler) would be the size of the user's DEC configuration. Since this can range from minimum core on the true mini 11/05, to a normal maximum of 128K with possible extensions to an absolute maximum of 256K on the medium-scale 11/45, this limitation may be more apparent than real.

The conversion process takes about a week, CSSC added, but turnaround time depends more on the complexity of the original program than on its size. Output can be punched on cards or paper tape as the user specifies, the spokesman noted.

While CSSC anticipates extending the conversion service to produce "target" source code for other hardware systems in addition to the PDP-11, the company's present plans do not include the use of anything but 360 Assembler source code as input.

The service is available for a dollar per source card, with no mimimum fee required. Comment cards are carried over into the PDP-11 Assembler source program without cost, the company added.

CSSC is at 333 N. Michigan Ave., 60601.

Trust Control Stretched To Include Reinvestment

NEW YORK – Banks with "75K or 80K" available under OS/360 may now extend their trust department operations substantially with the installation of the Dividend Reinvestment System (DRS) from Franklin Computer Associates Inc.

A batch-oriented system, DRS can be interfaced with a bank's normal dividend accounting system to handle the distribution of cash or stock dividends. The package is distributed in source and object code so either Franklin or the user can write the interface logic.

The prime purpose of DRS is the purchase of new shares as the cash dividends accumulate. Purchase orders and confirmations are generated as available funds reach predefined levels.

The system also supports the inputting of monthly cash contributions from outside the dividend system, allowing faster buildup of funds for investment than would be possible through accumulation of dividends alone, a Franklin source noted.

Custom Job

Accounts transcripts are produced on request by DRS and the system permits custom fee structuring by company. Tax data is calculated for preparation of year-end 1042 and 1087 forms and Internal Revenue Service magnetic tapes.

Made up of several programs, the largest of which is less than 80K bytes, DRS is written in BAL. The package costs $25,000, but purchase/lease plans are available.

Franklin is at 80 Pine St., 10005.

'Jasper' Shows Spool Use

NEW YORK – The Job Accounting Systems Programs for Evaluation and Reporting (Jasper) package from Datachron Corp. is designed to provide DOS/360 operations staffs with meaningful system use information on a daily and periodic basis.

An updated version, now available, works with "any of the popular spooling systems" and with CICS operations. Originally using the Job Accounting module built into DOS Release 25, Jasper has been extended to pick up utilization statistics from other sources as well, "even from Power, the IBM spooler," a spokesman added.

Historic View

In addition to accessing various sources of data, Jasper goes beyond accounting packages from other vendors, he said, by accumulating historic data on repetitive jobs. Current processing of a run is compared to its past average performance, and deviations are listed on an exception report for management review.

Schedule planning reports help to create effective job mixes for spooling and multiprogramming environments. At the other end of the operation, billing reports allocate the cost of each job in accordance with user-provided charging parameters.

Jasper is written in BAL and ANS Cobol and operates on both 360 and 370 CPUs. The basic system costs $4,000 and can be ordered from 174 Fifth Ave., 10010.

2260 DUCS 3270

We are pleased to announce the availability of DUCS-V (Display Unit Control System - Version 5). DUCS-V will concurrently support both the IBM 2260 Display Unit as well as the IBM 3270 Display Station in a local environment. The 3270 Display Stations are simulated in 2260 mode with no alteration necessary to the user's programs. The basic DUCS-V Program (2260 support only) is a licensed program product available from C F S, INC. for a monthly lease fee of $25.00. The DUCS-V 3270 simulator feature is also a licensed program product available for an additional $15.00 per month. The 3270 Simulator may be added to any DUCS-V System subsequent to the initial installation of DUCS-V without user reassembly or linkage editing.

DUCS-VI will be available during the 3rd quarter of 1973. Version 6 will support both local and remote IBM 3270 Display Systems providing users with a convenient means of utilizing the enhancements of the IBM 3270 System.

Requests for DUCS-V should be submitted to C F S. License agreements, DUCS-V abstracts and other details will be sent by return mail. Inquiries may be directed to Mr. Richard K. Goran.

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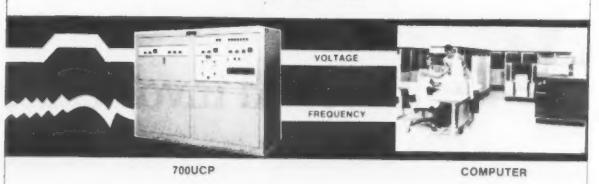

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Data Briefs

Communications Managers' Salaries Seen Rising

NEW YORK – Communications managers with "heavy data communications experience are earning between $16,000 and $23,000 per year, according to a salary survey conducted by Personnel Resources International Inc.

Managers with "some data communications" average about $13,000 to $16,000 and lower level supervisors are in the $10,000 to $13,000 category, the survey said. Senior telecommunications programmers currently earn between $14,000 and $18,000, the report added.

There has been a sharp increase in the number of firms seeking communications managers at the "lower and middle levels" in the past six months, according to Personnel Resources. This area had been "dormant" during the recent recession, the company said. The report is available from 342 Madison Ave., 10017.

Interdata Offers 'Pals'

OCEANPORT, N.J. – Interdata Inc. has announced a programmable asynchronous line system (Pals) for use on its "new series" minis.

Using MOS-LSI technology, Pals provides an interface between Bell 102- and 202-type data sets and the mini's multiplexer bus. The system can be used on both dial-up and leased lines and is priced "at less than $400/line" in a typical 16-line configuration, the company said.

Delivery is 60 days from 2 Crescent Place, 07757.

CSI Has Front-End

DALLAS – Communications Systems Inc. (CSI) has introduced a communications control unit which replaces both 270X and 3705 systems from IBM.

Called the Cope 4705 communications controller, the unit as a 1.1 μsec processor combined with a 250 nsec control memory that responds to 360/370 system addresses, commands and data sequences.

A 4705 system for supporting 20 asynchronous and two synchronous lines costs about $50,000 or $1,200/mo. Lease prices include maintenance. Deliveries are scheduled for the first quarter of 1973.

The company, a subsidiary of University Computing, is at 1500 UCC Tower, 75222.

Sanders 'Adds' Display

NASHUA, N.H. – Sanders Data Systems Inc. has introduced an interactive graphics display system called Adds/500.

The system includes a DEC PDP-11 with 8K of storage, a Model 33 TTY, utility software and a display generator.

First deliveries are scheduled for March 1973 from Daniel Webster Highway, 03060.

Avoids Access Methods

Hasp Helps Remote Job Entry Nets

By Ronald A. Frank
Of the CW Staff

NEWTON, Mass. – Users who need an efficient way to get into Remote Job Entry (RJE) operations can combine IBM's Hasp package with independent 2780-equivalent terminals.

One of the major advantages of Hasp is that it contains a communications module which gives the user a binary synchronous communications capability without having to resort to more sophisticated access methods such as Btam.

"The user often hesitates to get involved with access method programming but the Hasp system is much easier," one consultant said.

"If you emulate a 2780 using Hasp and add a mini to the terminal, you can make it do things that a 2780 can't do," another spokesman said. It is this addition of a mini to the 2780-equivalent terminal that has provided users with an RJE capability that is usually priced lower than the IBM 2780 and can be as low as $350/mo with a cassette capability.

The IBM 2780 costs about $800 to $1,000/mo while the average independent equivalent terminal usually costs between $500 and $600/mo, according to one industry spokesman. Most of the independent terminals have a 300 card/min reader and a 200 line/min printer with their RJE configuration.

One advantage of using Hasp for the RJE line discipline is that it improves throughput compared with other RJE operations.

Acknowledge Time Reduced

With Hasp, the acknowledge sequence time is reduced because instead of transmitting an acknowledge (Ack) signal, the central site responds to receiving a block of card data by immediately sending a block of printer data back to the remote site.

So instead of the 2780 user having to wait for the line to turn around when the Ack signal is transmitted by the central site, the Hasp user gets increased throughput which looks like simultaneous full-duplex transmissions, the consultant said. Even though the data is still being sent in half-duplex mode, the throughput is considerably increased with the Hasp capability, he said.

Most of the independent Hasp terminals require the user to initiate some minimal routines to condition the system. "You have to gen the RJE capability but the package is pretty clean in this respect," one user said.

"The most important feature is that we have a common Hasp interface to the mainframe so we don't have to bring up a separate package to do the RJE work," he said.

One vendor that has supplied a low-cost Hasp terminal to users is Sycor. By eliminating the card reader and substituting a cassette system, the firm offers an RJE capability for about $350/mo.

The system uses a 30 char./sec printer but this is fast enough for most low-volume Hasp RJE applications. The cassette system allows high-speed transmission of data to the terminal, with the tape storage acting as a local buffer to feed the data at a rate that can be accepted by the slower printer.

Most users with the independent 2780 terminals like the addition of some processing capability at the remote site.

"The intelligent terminal checks the data to make sure it is accurate before it is transmitted," one user said. Most of these terminals make sure there are no incorrect column punches or other errors in the card data, he said.

Another feature of the Hasp package is its "stability" according to one user. The package has been upgraded to system status with the new virtual operating systems, he said.

It is possible that IBM might introduce a new version of Hasp that would make it more difficult for independent terminals to operate in 2780 emulation mode. "But if it were simply a software change, we could probably give the user the necessary software to overcome any restriction," one vendor said.

System Reliability, Redundancy Held Vital for Communications

ANAHEIM, Calif. – Successful operation of computerized communications systems requires high reliability and redundancy to assure maximum uptime, according to speakers at a recent communications meeting.

Large-scale data communications networks such as the Integrated Telephone Customer Information System (ITCIS) in The Netherlands involve large batch runs with high-load real-time inquiries, according to Robert A. DiPalma, formerly with Pandata N.V., the software firm that designed the ITCIS system for the Dutch Post Telephone and Telegraph (PTT).

The Dutch system will be used through a nationwide computer/communications system to handle all PTT directory assistance inquiries, in addition to billing and collections, work order entry, customer services inquiries, cable and wire pair administration and management information, he said.

Fast Directory Assistance

The average response time for a directory assistance call is estimated at three to five seconds from anywhere in the country. The ITCIS will utilize PDP-11/20s as remote processors to poll terminals, edit input messages, smooth traffic peaks and provide error protection with minimal impact on the central CPU, DiPalma explained.

The system will utilize 15 high-speed private line links operating at 2,400 and 4,800 bit/sec in full-duplex mode. A segmented message transmission scheme will be used which will acknowledge the first, last and retransmitted segments of messages, he said.

The mainframe proposed for the ITCIS is a Univac 1110 with three 8440 disk subsystems. The communications interface will include two Univac communications terminal module controllers. Terminals supported by the system include 425 CRTs and 200 teletypewriters, he said.

Modular Unit Configures Lines

SOUTHBORO, Mass. – Data General Corp. has introduced a modular Multiline Asynchronous Controller that can be used to configure communications nets with up to 1,024 lines.

The controller can handle line speeds up to 9,600 bit/sec and interfaces for both dial-up and private lines are available. The controller operates with any Data General mini and can also be connected with the firm's existing synchronous interfaces and multiplexers.

To configure a data system, the user's communications lines are connected to line interface modules which in turn are tied to "bus drop/clock" modules through a printed circuit bus that is part of the controller's chassis.

The modules can also be directly connected to the data controller and modem control in the CPU, the company said.

Communications systems support is at the operating system level. In addition, the company provides software at the transmitted block of data level. But applications programs have to be developed in-house by the user, the spokesman said.

For front-end applications, programmable IBM 360/370 interfaces are available with as many as 15 Data General minis interconnected through a multiprocessor communications adapter. Synchronous and bisynchronous multiplexers are also available, the spokesman said.

A 192-line system with 128 lines with modem control and 64 lines for direct connection costs "under $60,000 or about $300/line," the company said.

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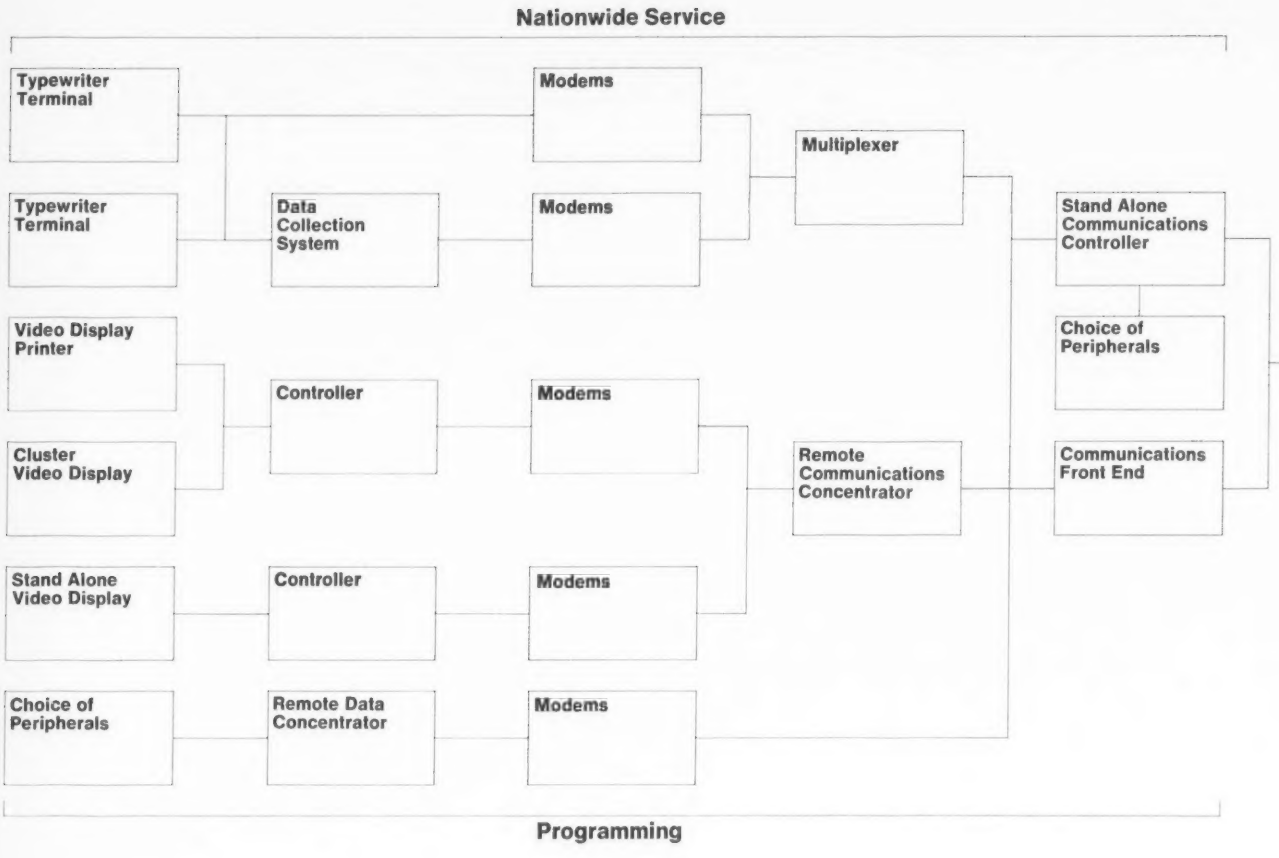
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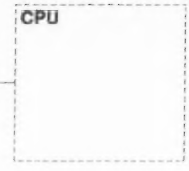

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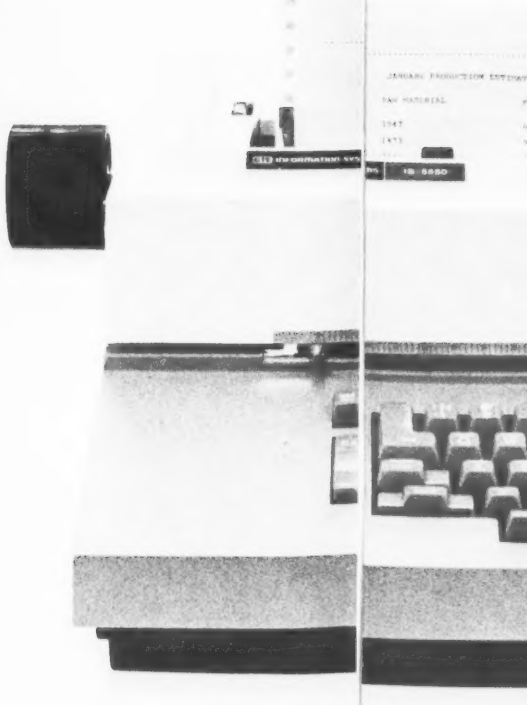

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(In considering stand-alone vs. cluster systems, remember: the stand-alone unit gives direct computer access but requires its own control unit. A cluster arrangement can provide this access for a whole group of terminals using a common control unit. Both types are available for either local or remote operations.)

A video display is a transient thing. If you want a permanent record along with the CRT's speed, we can give you either a desk-top thermal printer to make single copies at up to 30 characters per second; or an impact printer, for an original and up to 5 copies. Both are buffered.

Then, there're our typewriter terminals. Here, too, we can furnish everything your data communications system needs.

These terminals include buffered storage capacity of up to 790 characters. This means that data entered at typist's speed can be transmitted later at 2400 baud. In the receiving mode, buffering now permits receipt of a 2400-baud message and delivery at 15 characters a second.

And, if you'd like to do better than that, our high-speed printer delivers data at 30 characters a second.

Finally, if you can afford to wait and transmit your data in a batch mode, the cassette recorder stores up to 73,000 characters, for high-speed transmission at a later time.

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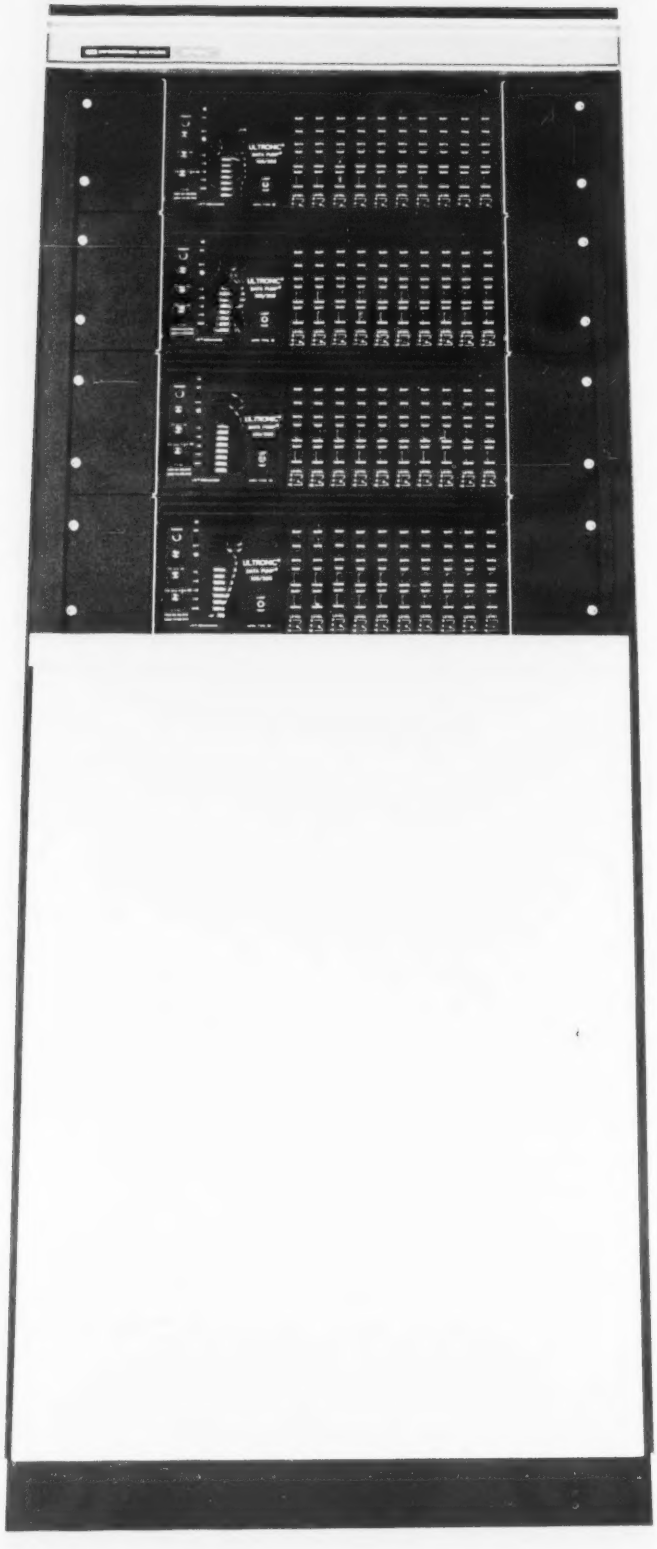
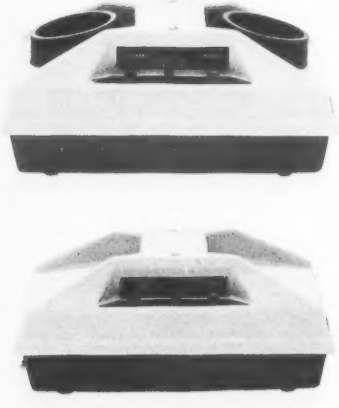




Pick the modem that's just your speed

Next step in the data communications chain—the modem.

You might be surprised at how much you can save by having the right modems married to the right terminals married to the . . . but you get the idea.

It really boils down to how fast the terminal talks. And, since there's such a variety in that, GTE Information Systems has put together a family of modems to handle just about any problem.

Our smallest model, a 300-baud modem, comes in five variations: acoustic-coupled or hard-wired originate-only; hard-wired answer-only; and data-card file answer-only in two file-card storage capacities.

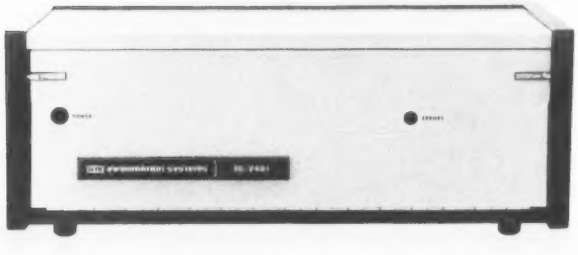
Our 1200 and 2400-baud modems have a change-over feature that lets you switch from your dedicated line to the dial-up network at the press of a button.

For high-speed transmission, there's our 4800-baud unit. Using duo-binary coding, it eliminates the dc component in the signal, allowing you to transmit more error-free data over standard Series 3002 lines with C2 conditioning.

All our modems are economical, and telephone company-compatible. And all have pushbutton trouble-spotting, so problems can be isolated in minutes.

In most cases, you'll find our modems cost less than comparable units. And they're all available from stock.

When our modems get between you and your computer, you get top efficiency. And save money, too.



TDM or FDM? The wrong decision can cost you money

You've got the terminals and the modems. Now for the multiplexers.

The question is, when do you need them, and what kind do you need?

From the systems viewpoint, the answer comes from your total requirements.

Everybody knows that multiplexers literally multiply the effectiveness of your leased lines. Either by time division or frequency division, they combine many channels into a single high-speed output for your leased lines. We make both kinds.

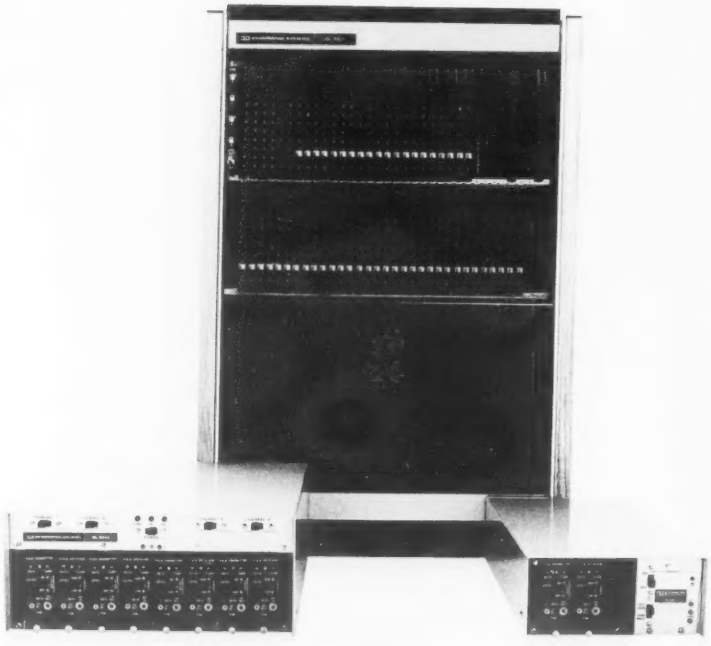
When you operate only a few channels, chances are, you ought to aim for FDM, frequency division multiplexing. Roughly speaking, each FDM channel will cost you about $600.

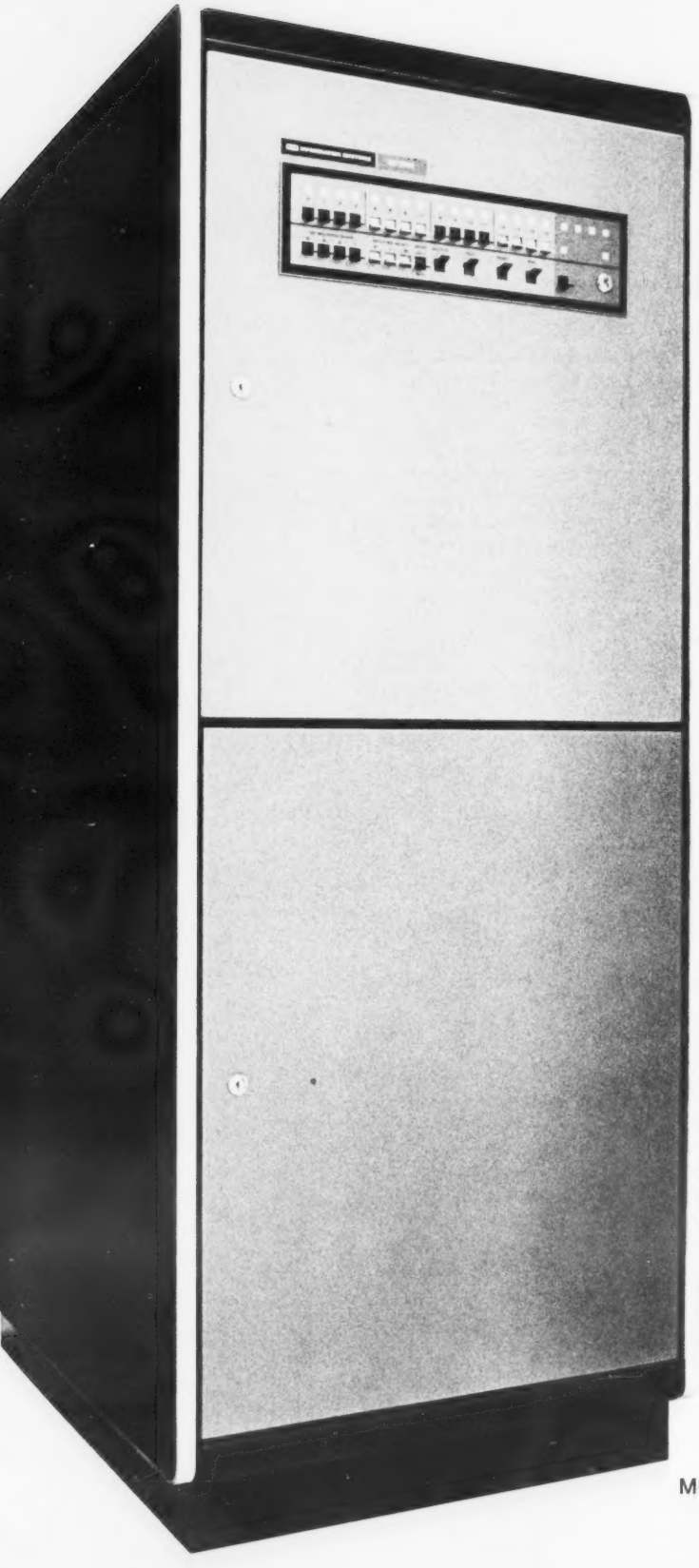
GTE Information Systems has FDM units that will handle up to 23 channels on voice-grade line and 25 channels on a conditioned line.

If your bottom channel requirement is around 13, you probably ought to consider time division. The first channel costs a lot—around $4,000. But the cost per channel drops rapidly. At 16 channels, the cost is about $8,000.

We have TDM's that can handle up to 54 channels.

How do you know what you need? Guidelines like these help. It's even more helpful, we think, to talk to the people who make everything for total data communications. Everything that stands between you and your computer.





A little concentration can solve your data flow problems

Until now, we've talked about how complex and interrelated the parts of data communications systems are.

Now, here's a problem that arises because systems like these exist.

It's simply the vastness of the systems.

There's an incredible number of repetitive functions called for in today's state-of-the-art operations: jobs like polling, queuing, reformating, addressing.

The kind of things any computer can do.

But your mainframe's main job is processing information. And every microsecond away from that is a loss of time and money.

Solution? Give your computer a computer. One that can handle these "housekeeping" chores of a widespread system.

GTE Information Systems makes a line of small computers for such jobs. For use as front ends; or as standalone message switches, controllers, data concentrators and intelligent terminals.

These are real computers . . . with memories up to 131K . . . programmable. They can handle codes and formats that haven't been invented yet.

It's a very efficient way to take some load off the main computer.

Because we were between you and your computer in the first place.

MULTIPLEXERS/COMMUNICATIONS PROCESSORS

GTE INFORMATION SYSTEMS

A program that treats your computer right can be a treat to your pocketbook, too

Software. It's what makes your system work.

Since it's the part of the system that tells the central computer what to do, you might even think software is the most important part of all.

At GTE Information Systems, we have developed software programs for many computer system needs. We are one of the country's leading creators of tailored programs.

We have also developed a state-of-the-art system, FCF (Front-end Communications Facility) that handles all network control, message processing and assembly, switching and data collection. It's one of the first marriages of software and hardware for the front-end part of the computer.

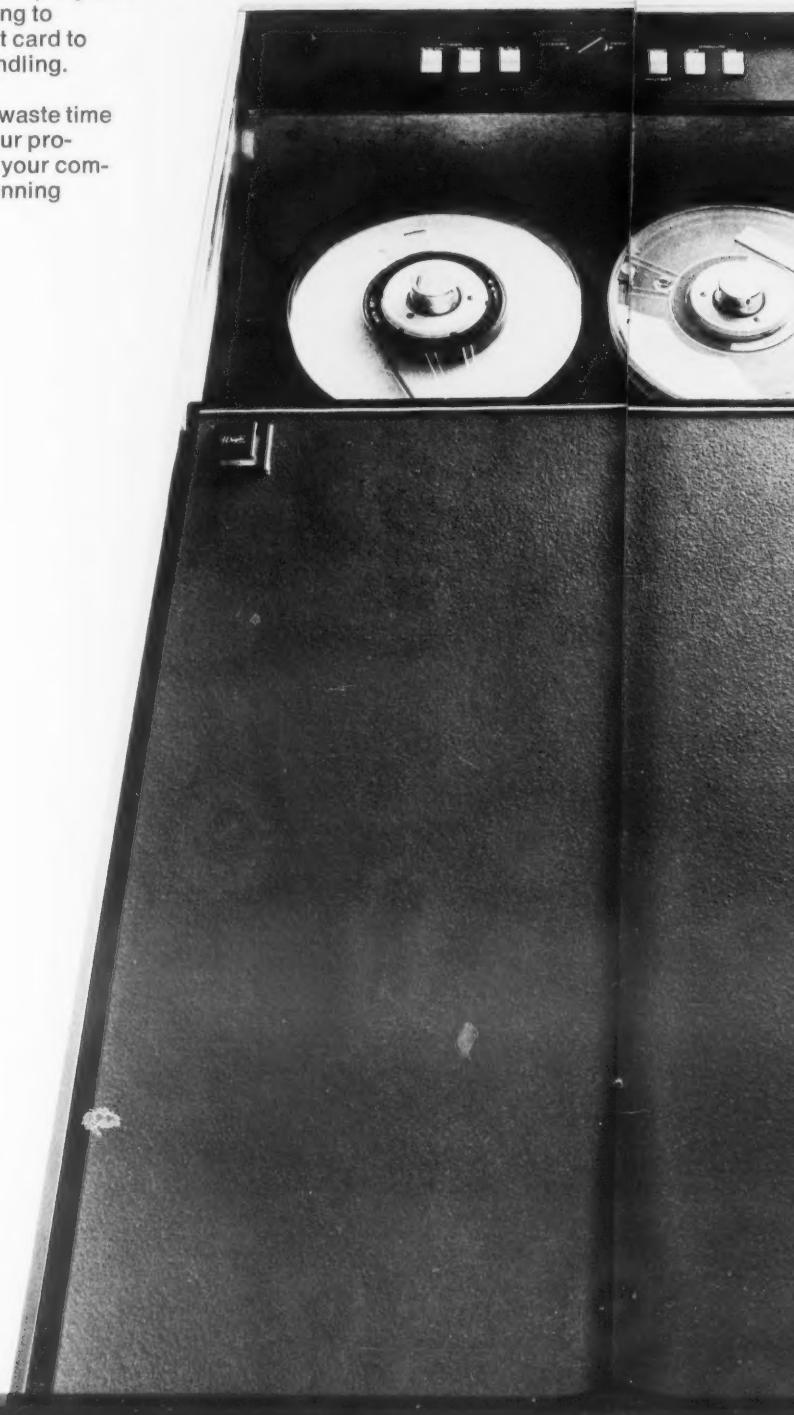
Programs? Intercomm™, for one. It allows you to move from batch to on-line without replacing your computer.

Minicomm™. For smaller systems, it can put you on-line with as little as 24K memory—without adding core.

Score. It converts ordinary language into a Cobol program.

. . . to say nothing of special programs for industries from banking to publishing . . . from credit card to parking ticket record handling.

The wrong program can waste time for your whole system. Our programs, between you and your computer, can keep things running smoothly.



How to get the same service in New Mexico as you get in New York

As you've seen, we provide all the essential pieces for your data communications system.

Plus service. The vital ingredient.

GTE Information Systems includes a complete systems service, from installation and maintenance of equipment to helping you get your software integrated into your operations.

Nine out of every ten data communications installations in the country are within an hour's drive of one of our servicemen. The rest aren't much farther.

Specifically, our service organization includes more than 600 men in 85 cities around the U.S. and Canada. Trained in our own schools, they know how to diagnose a problem, and how to correct it. Fast.

We want to get between you and your computer. We don't want to interfere with it.

That's why our servicemen are always nearby.

And—wherever you are—there's only one number for you to call—collect: 303-449-7800.

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We'll keep you on speaking terms with your computer

Think of what's happened outside the computer room.

A whole new business has evolved: data communications. A business we helped create.

It's entirely new—and nobody understands it better than we do. Used properly, it can help you make data processing a very senior management tool.

GTE Information Systems covers the data communications business totally . . . from you to the computer. We provide the hardware and the software, and furnish the service. Coast to coast. Continent to continent.

No system is too widespread, or too complex.

For example, we created and operate one of the largest privately owned communications systems in the world. Serving the brokerage industry worldwide, it's a 100,000-mile network encompassing 21,000 terminals, 33 satellite computer locations and a master computer center.

It provides brokers throughout the world with all the vital information they need—as it occurs and as it changes. Instantly.

The point is: we can supply everything from a single terminal to a global network. The products. The experience. The programming. The operation and service. All with complete inter- and intra-system compatibility.

When we get between you and your computer, everybody talks the same language.

If you'd like to see how we talk your language, too—or for specific details on any equipment or service we offer—mail the postcard.

GTE INFORMATION SYSTEMS

Printed in USA

I'd like to know more about

- ☐ **The whole data communications system**
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- ☐ **Typewriter terminals**
- ☐ **Modems**
- ☐ **Multiplexers**
- ☐ **Communications processors**
- ☐ **Programming**
- ☐ **Service capability**

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'Cool Operator' Really Handles Beverage Dispensing Machines

Special to Computerworld

PHILADELPHIA – A small computer is being shared by two separate but related companies housed in the same building to operate machines which dispense frozen carbonated beverages in retail stores in 31 national markets.

The difference between profit and loss has been the fast turnaround provided by

The Small Systems User

the NCR Century 200 in the processing of sales, ordering supplies, billing and the preparation of customer reports, David W. Williams, data processing manager of National ICEE Corp. and E.B. Evans Inc., said. "If it weren't for the computer, we'd be unable to maintain the right corporate control that now exists," he said.

Management is working toward the goal of having the computer handle just about every job required by Evans and ICEE.

At present the system processes all orders, handles all billing, maintains receivables and payables, controls all purchases and production, maintains the general ledger, monitors manufacturing-to-production batches, processes the payroll and prepares profit reports for ICEE distributors. "When we're finished," stated Arthur Abramson, executive vice-president and treasurer of both firms, "all aspects of Evans and ICEE will be on computer."

The system consists of a central processor with 32K memory, dual-spindle disk drive, an NCR 640 high-speed 1,500- to 3,000-line/min printer and card reader. All card sorting and handling (except for initial input data) have been eliminated with magnetic memory disk packs.

The system's programs are also sorted on disks, making applications easier to change and faster to run. Each program is automatically called from storage when the operator presses a few keys on the console. The system is programmed in Neat/3 and Cobol software.

The work flow for Evans begins with the receipt of orders from salesmen and customers, arranged according to the various plant locations. The input data is keypunched and a computer-prepared order form is routed to shipping. After the shipping department has filled the order, the order report is returned to data processing for billing.

A four-ply two-part invoice is prepared; one part is sent to the customer showing what has been shipped; the second part contains detailed management information (gross profit, net profit and gross margin) and is retained. At the time of billing, the customer's master records, which are on disk, are updated.

The preparation of statements, which formerly took 16 hours, is now completed in 45 minutes. Sales analyses are generated in 40 minutes instead of 14 hours, Williams noted.

Several routines can now be performed simultaneously, thus eliminating costly waiting periods.

Neighborhood children have no complaints about automation.

Shipper Learning To Love Paperwork

By John H. Robinson

Special to Computerworld

SAN FRANCISCO – Many small companies are swamped with paperwork which impacts their operation and profitability, but with the installation of small computers in major branch offices, Harper, Robinson & Co. is now thriving on paper processing.

The company, an ocean freight forwarding firm, generates shipping papers and stacks of import/export documentation for its clients.

The written record forms the basis of control for export and import of thousands of shipments worth millions of dollars.

In the late 1960s all documents at the company were still being typed by hand at an average speed of less than 50 word/min.

There was much duplication of effort, since the various documents for the same shipper contained name, address, ship-to-points and other common information.

Ocean bills of lading were rated manually, which meant clerks spent much of their time paging through tariffs to locate and apply the correct rates and codes.

Management installed IBM 1130 computers in two West coast offices in 1968. In 1971 it was decided to upgrade to System/3s and include two other offices.

These computers now handle 70% of the export documentation and 50% of import paperwork at these offices.

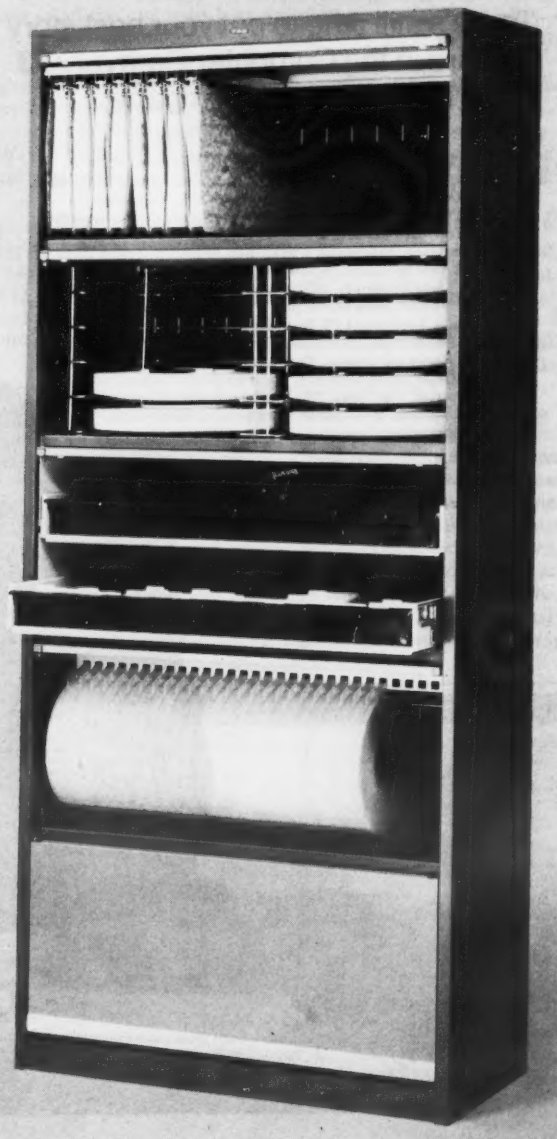
With the small computers the firm can offer customers in-transit inventory reports which are produced weekly or as required by the client.

John H. Robinson is president of the Harper Group of International Total Transportation Companies, San Francisco.

Orderly, Safe Storage In Minimal Space —that's proven Tab Data Media Cabinets. Versatility was born into these cabinets. They have been designed to accommodate hanging printout binders, disk packs and racked or hanging magnetic tape. They are even ideal for storing cards. Tab Data Media Cabinets can be ordered with roll-out shelves that bring data media right to your fingertips.

And, if storing miscellaneous office paraphernalia is a problem, forget it. Just tuck it away in the generously-sized Data Media compartments and close the stylish TrimLine doors. Neat. For complete information about Tab 2, 3, 4 and 5 high Data Media Cabinets, call your local Tab representative. Or, write Tab Products Company, 2690 Hanover Street, Palo Alto, California 94304.

Tab System/3 Organizer



TAB PRODUCTS CO.

"That's an interesting story. Why didn't I see you at The Computer Caravan?"

Thousands of your prospects will be at The Computer Caravan/73. If you're not, they won't hear your story. But they will hear someone else's. That's not so good for your salesman. Or for you.

There's still time to put your best story forward in the Computer Caravan/73. You'll have excellent company:

Lockheed Electronics, General Computer Systems, SYS Associates, Penril Data Communications, Cambridge Memories, Eastman Kodak, Cincinnati Milacron, AT&T, Techtran Industries, Vermont Research, Computer Transceiver Systems, Inforex, Hewlett-Packard, Systems Engineering Laboratories, Prime Computer, Interdata, Tektronix, Western Union Data Services, BASF Systems, Anderson Jacobson, Entrex, Cullinane, Data Products, ICC/Milgo, Paradyne, Sycor, Hazeltine, Varian Data Machines, Teletype, Incoterm, Sanders Data Systems, ITT Data Equipment & Systems, Auerbach Publishers, Data Disc, Computer Devices, Boeing Computer Services, Iomec, Texas Instruments, CIG Computer Products, Delta Data Systems, Data General, Centronics Data Computer, Per Data, I/O Devices, Sierra Research, Datapro Research, Electronic Memories & Magnetics, Modular Computer Systems.

For further information,
call Neal Wilder or Dottie Travis
at (617) 332-5606

The Computer Caravan/73

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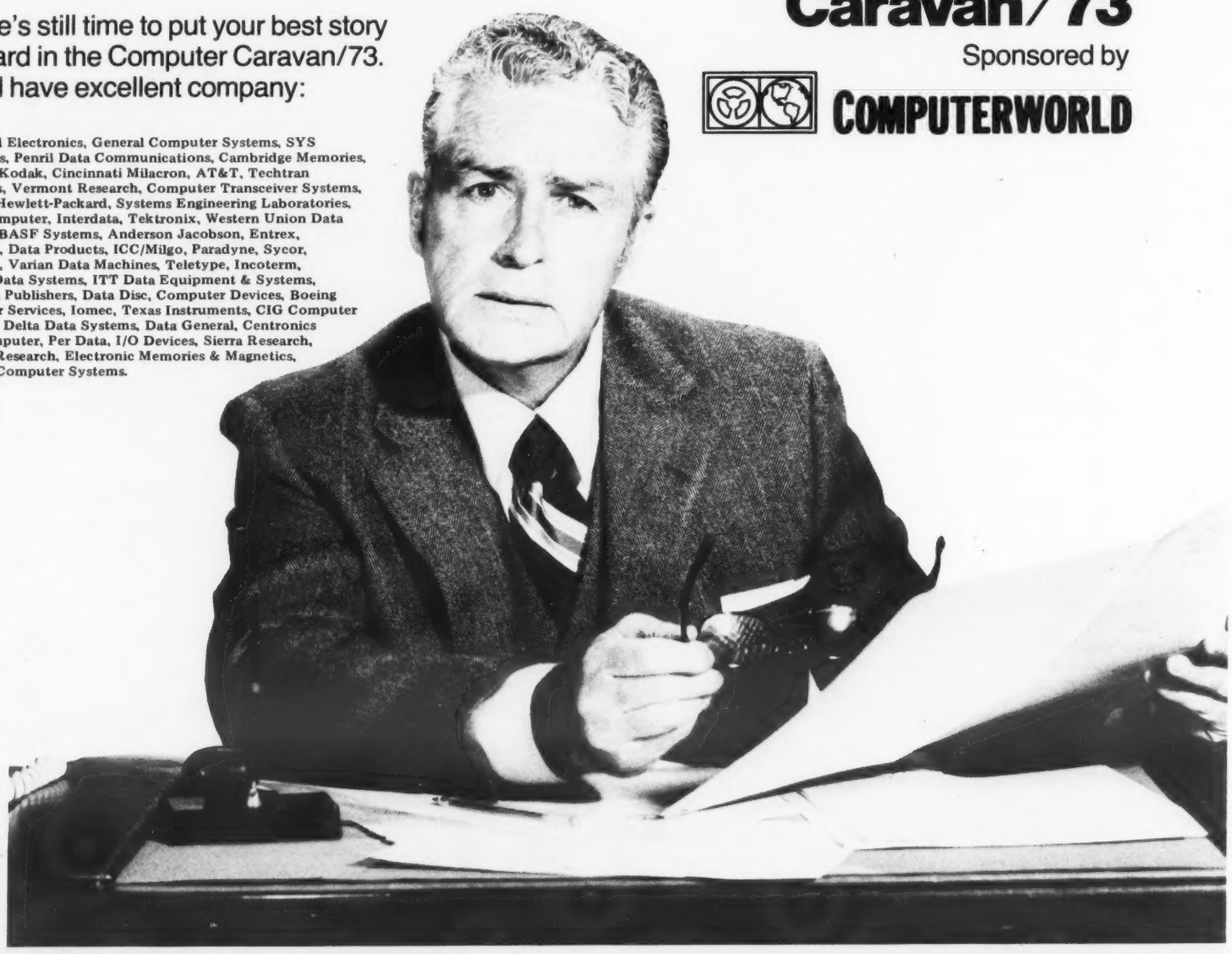

Bits & Pieces

Remote Terminal Has OCR Capabilities

ANAHEIM, Calif. – A remote terminal with optical character recognition (OCR) capabilities is being offered by Datum Inc. to users with data-entry requirements.

The Model 5098 reads data from source documents, assembles it into Ascii alphanumeric characters and formats it for asynchronous transmission over normal telephone lines.

Any conventional asynchronous remote receiver can be used – teleprinters, paper-tape punches, video-display terminals – the firm spokesman said.

Normal scan speed is 9 in./sec, with other speeds available. Transmission rates are 10-, 15-, 30-, 60- and 120 char./sec, the spokesman stated.

Price for the standard 5098 is $1,795 from 170 E. Liberty Ave., 92801.

Large Plotter Boasts Fast Operation

CANOGA PARK, Calif. – A computerized flatbed plotter series with a work area of 6 ft by 10 ft to 6 ft by 20 ft is available from Xynetics, Inc.

The computer-based Series 2000 system has a maximum velocity of 30 in./sec maximum acceleration of .8G, resolution to one mil and accuracy to ±0.005 in. over the total drawing area, the firm said.

The system comes with an optional paper-feed system for contiguous plots to accuracies up to ±0.030 in. The drafting head can accept liquid and dry pens, scribe tools and photo heads, the spokesman added.

Depending on exact specifications and the software needed, the Series 2000 will cost in the $60,000 to $150,000 range from 6710 Variel Ave., 91303.

PDP-9 Users Offered Memory

LEXINGTON, Mass. – DMS-9 add-on core memory from Dimensional Systems Inc. is designed as expansion memory for the PDP-9.

DMS-9 expansion memory with controller costs $14,500 for 8K, $19,600 for 16K and $25,600 for 24K compared to DEC's stated cost for added memory and controller of $14,500 for 8K, $26,500 for 16K and $38,500 for 24K.

The firm is at 31 Hartwell Ave., 02173.

Microprogramming Leaflet Free

SUNNYVALE, Calif. – "Debugging Microprogrammed Systems" is the title of a four-page application leaflet available to designers of data-handling equipment.

The leaflet is directed specifically to engineers telling how flaws can be removed from computer memories, according to the author, Dr. William Davidow of Signetic Memory Systems.

Free copies are available from 740 Kifer Road, 94086.

Showing the Colors

Staran computers, developed over the past 10 years by Goodyear Aerospace, are demonstrated in a new facility at the firm's Akron, Ohio, headquarters.

...Making News On-Line

●UPI Trades Pencils For CRT Displays

By Michael Weinstein
of the CW staff

NEW YORK – Editors at United Press International are exchanging their teletypewriters, yellow paper and pencils for a computer network and display terminals.

Stories submitted from around the world are entered into UPI's computer facility in New York. From there an abstract giving a brief description of the story is sent to all UPI editors – news, sports, financial, etc. This abstract appears on the editor's CRT display and tells him enough about the story for him to determine whether he wants to see it.

If the editor requests the story from the terminal keyboard, the entire story is displayed. To facilitate handling, the editor can roll copy forward and backward by a control button.

Before Your Very Eyes

When the editor wants to change any portion of the copy, he moves a cursor to the desired point and adds, deletes or replaces letters, words, sentences or entire sections. Changed lines automatically open and close up on the screen.

When a story is completed, the editor can direct the computer to hold it for future use or it can be immediately placed in an output queue for transmission to subscribers of the news service.

The system allows for the placement of a priority on what goes over the wire. A late-breaking story can be placed anywhere in the queue or can interrupt a story being sent. At the end of the "flash" the interrupted story picks up where it left off.

The system is designed using a shared file capability to allow different editors to work simultaneously on the same story. Each editor's version is available for later retrieval from the computer, as is the original copy sent from the field.

Presently 42 editors access the computer network: 36 in New York, four in Washington and two in Chicago.

●PDP-10 Supports Complete System

MAYNARD, Mass. – By interfacing a phototypesetting system to a PDP-10 time-sharing computer, Digital Equipment Corp. is offering newspapers a total operations system.

The system can support up to 127 remote terminals from which reporters can enter stories, ad managers can input ads, production personnel can output galleys for pasteup and other personnel can perform functions such as billing, circulation and payroll, according to DEC.

As reporters enter copy, a name is assigned to each story so it can be accessed later for on-line editing and updating.

Once edited and approved, stories are justified and hyphenated for transmission to the photo composition units for typesetting.

Wire-service copy can be automatically input to the data base of stories and used in the same way as locally written material.

Using remote terminals, reporters can enter stories "from the scene" through standard telephone lines. The editor can access this story on his terminal, make corrections and send the story on for typesetting.

Up to 300 ad classifications can be accessed using coding which enables the manager to start, skip and kill dates. Expired ads are held in the data base for a specified time – giving time for renewal. Overdue customers are listed creating the option to reject ads.

A monitoring system allows the directing editor to produce programs showing the copy content and status of stories with the size and number of ads being prepared, according to the firm.

The DEC-1044 is the minimum CPU for the system with 96K 36-bit words of memory, 100M bytes of disk storage, two tape drives, line printer and redundant communications-checking equipment.

The price for the minimum system and software starts at $950,000. Larger PDP-10s can be ordered.

4M Bytes for 155, 165
370 Gets Add-On

By a CW Staff Writer

SAN FRANCISCO – Users of IBM System/370 models 155 and 165 can add Advanced Memory Systems memories up to 4M bytes, according to an Itel spokesman. (Itel markets AMS equipment.)

This compares with the maximum original design capacity of 2- and 3M bytes of main memory respectively on the IBM models, the spokesman said.

AMS has also completed engineering the CPU upgrade system hardware necessary for the add-ons. Starting in February 1973 (for the 370/155) and June 1973 (for the 370/165) these upgrade subsystems will be incorporated into all AMS add-on memory modules.

If not so incorporated, the CPU upgrade hardware would have to be ordered from IBM, at an extra cost of $15,000 to $18,000 and with a required downtime for installation of from 24 to 40 hours, the spokesman asserted.

Familiar Theme

The semiconductor process technology used by AMS in the 4M-byte add-ons is similar to the recently announced IBM memory systems used in "virtual memory" for the new 370/158 and 168, the spokesman said.

Compared with ferrite cores, standard to the 155 and 165, the new monolithic memory delivers higher performance while costing less, requiring less power and space, and generating less heat, he said.

The AMS add-on can be retrofitted to all 155s and 165s, from a zero-up basis in which all core memory is replaced with monolithic memory.

Cost for the 3M-byte version for either machine is $1,188,000 with a lease plan ranging from $32,400 to $27,000/mo on two- to five-year leases.

Purchase price of the 4M-byte version is $1,584,000 on either machine with leasing from $43,200- to $36,000/mo on two- to five-year leases.

Itel is located at One Embarcadero Center, 94111.

Array Supercharger Offered Nova Users

SYOSSET, N.Y. – Users of Data General computers can speed up the array-processing capabilities of their minicomputers by a factor of from six to 70 with a hardwired array-processing arithmetic and logic unit (Apgen 1) from Elsytec, a firm spokesman noted.

For example, the multiplication of two 1,000-element arrays takes 2.8 μsec using a Nova 800 with Apgen 1 as opposed to 19 μsec using the Nova with hardware multiply and divide, the spokesman said.

Apgen 1 performs addition, subtraction, multiplication and division of two arrays composed of 16-bit words and also can take the square root, integrating, accomulating and performing logical operations on the elements of the arrays, the spokesman stated.

the centronics phenomenon:
after 2 instant successes, could we have 3 more in the wings?

The 306. The fastest, low-cost 80-column impact printer.

The 102A. At 125 lines/min, it's twice as fast as our first models.

The 401. A low-cost 132-character crt terminal.

And they're all in production. Phone or write Dept. 1056.

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telephone (603) 883-0111
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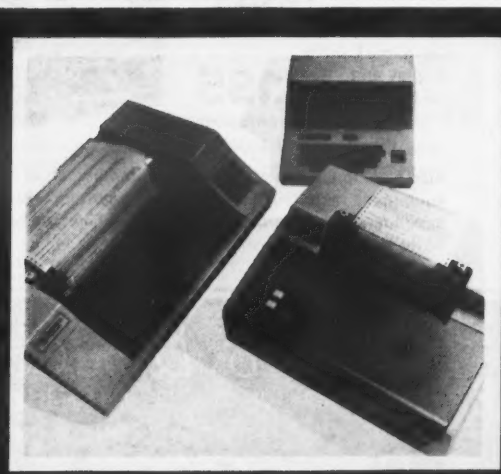

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Houston, Tex. (713) 772-1772

User Expects 20% Production Increase With Computer Controlled Test System

EULESS, Texas – The Continental Telephone Electronics Company expects a 20% increase in the production of circuit boards by switching to computer control for production and testing.

The circuit boards enable a telephone line to be used for up to eight simultaneous conversations by "coding" each conversation into a different non-interfering frequency.

On the first of two inspections of these boards, the IBM System/7 takes readings at about 50 locations. If a failure is detected, a signal is displayed on the control unit to indicate the location of the malfunction. This allows an inspector to make an adjustment or send the board back for repairs.

The total handling time per board for this test is 8 seconds, only 2.7 of which are used by the computer.

Second Test

On a second test, each circuit is analyzed under simulated use in telephone service. In 13 seconds, the computer tests 20 functions, indicates any failures and gives readings so that technicians can adjust each board to optimal performance.

The computer, which tests about 400 circuit board/day, also keeps a cumulative record of types and locations of malfunctions detected. Engineers can then obtain a printed summary of malfunctions. This summary is used to pinpoint types of errors and improve design and production phases.

"The computer makes initial circuit board inspections 40 times faster than we could do it before," a spokesman said, "and we're now testing all elements on a circuit board. This was not possible before."

DEC-10 Users Get 2316-Type Disk Packs

IRVINE, Calif. – DEC PDP-10 users can now obtain a disk system utilizing the same dual density storage techniques used by IBM 2316 disk packs, according to the vendor, Telefile Computer Products.

The disk system provides storage capacity up to 116M bytes per single disk storage cabinet with the DC-10G controller connecting directly to the PDP-10 through the DF-10 high-speed channel, the firm's spokesman said.

Operating features of the Telefile's DC-10G controller include verification of track location by hardware, error checking of data transfers by hardware, simultaneous seek operations, monitoring of many subsystem conditions and direct transfer to and from memory for data – eliminating blocking I/O channels, the spokesman stated.

Storage Units

The disk portion of the system is produced by Century Data Systems for Telefile and consists of dual density, high-speed, random access storage units. Each drive utilizes an 11-high disk pack.

Over 58M 8-bit bytes can be stored on the 20 recording surfaces of each pack with each disk accessed using 200 track/in. technology, the spokesman said.

Access to any of 406 positions on the disk is accomplished with a track-to-track access time of 10 msec and a maximum access time of 55 msec. Data is transferred at a rate of 312K 8-bit bytes/sec at a rotation speed of 2,400 rpm. The drive is up to speed in 90 sec and dynamically braked in 11 sec, the spokesman said.

The DC-10G controller is priced at $25,000 while the dual density disk drives – with a capacity of 116M 8-bit bytes per unit – are priced at $11,000 each from 17795 Sky Park Circle, 92664.

OCR Unit for Small Forms User

EAST HARTFORD, Conn. – Data entry users with a few applications involving small-sized forms – such as turnaround documents used for billing – can get a relatively low-priced Optical Character Recognition reader from Scan Optics.

The 20/10 is able to read forms up to 6 in. by 9 in. or journal tape using numeric, alphabetic and handprint input, the firm's spokesman stated.

Scanning speed is 2000 char./sec with a maximum throughput speed of 500 form/min, he said.

Compatible peripherals include most standard line printers and tape drives, the spokesman said.

Error control is performed by programmable on-line display and insertion, character rescanning, sorting, edge marking and serial numbering, he added.

Software is included for selective field scanning, editing and formatting. All software is compatible with Scan Optic's larger 20/20 system so the user can easily upgrade when he needs extended capabilities, the spokesman said.

Price is about $2,000/mo on a two year lease or $85,680 purchase from 22 Prestige Park, 06108.

A family of low-speed modems for the user or OEM. Here are eight models . . . many others to choose from.

modems

Model 150A—Acoustic coupler for TTY only $147

Model 150P—Built-in acoustic coupler for Series 33 Teletype..... $175

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5561

Gas Load Needs Under Control Here

By C.A. Roberts
Special to Computerworld

PORTLAND, Ore. – Northwest Natural's main goal was, and still is, to do a better and more efficient job of controlling gas "takes," to attain the best possible load factor and resulting gas cost for our company. This goal is now being reasonably accomplished with a computer system saving the company some $50,000 in personnel costs, through elimination of manual efforts in gas control activities.

Accurate monitoring of flows and projection of daily gas requirements is the most important function of any gas control department. On Northwest Natural's large geographically oriented system, there are approximately 190,000 customers using over 980 million cubic feet of gas annually.

In the past an accuracy of ± 5% for gas purchase volumes was considered satisfactory. With the present tight gas supply situation in the Pacific Northwest it became necessary to reduce this tolerance to the range of ± 2%.

Faced with the need to handle these much tighter tolerances, Northwest Natural Gas turned to an IBM 1800 data acquisition and control system in 1970.

Control of system gas requirements can now be kept within these limits, providing meters and telemetry equipment are kept in calibration.

Before the computer control system was installed, the gas control supervisors at the control center had to spend a major portion of their time reading instruments and calculating gas flow rates.

The supervisors were thus left with little time for decision making; thus, it was difficult for them to do an adequate job of forecasting requirements which is essential for maintaining the balance between gas purchases, storage gas and gas sales that is necessary to achieving an optimum overall system load factor.

But Now . . .

In the new procedure, all telemetry signals are transmitted directly to the system in the control center. Some 245 signals are received by the computer, covering flows from orifice meters with static and differential readings, BTUs from calorimeters, pressures from line gauges and digital counter readings from positive displacement and turbine meters.

The interface between the telemeter system and the 1800 is a reed type relay system. Each signal received at the computer center has a relay for its point of connection to the computer. Through this type of interface the company can receive both digital and analog signals as well as check telemeter transmitters and receiver calibrations against computer readouts.

At several locations throughout the company's distribution system it is necessary to obtain more than one signal to transmit pressures from important control points. To accomplish this the computer keys a transmitted 420 cycle/sec tone every eight and 12 minutes which in turn switches solenoid valves at telemeter transmitter locations for denoting upstream and downstream pressure readings at pressure regulators.

The system computes hourly gas usage for the major industrial customers as well as gas taken into the system from the supplier's pipeline. From this data, the computer prints out an hourly demand log showing gas flows by gate station and customer.

Accurate Projections

Because complete and accurate information on hourly flows and accumulation of flows is available on a current basis, the gas control supervisors can project their load requirements much more accurately, and thus are better able to maintain as high a load factor as possible while keeping inflows to the system within the limits of gas entitlement specified by the pipeline.

The computer continuously scans flow and pressure readings, and an alarm signal is activated in the event any increase or decrease in pressure beyond set limits is detected at designated points on the system.

The gas control supervisors can also at any time call for a printout summarizing all important pressures on the system, or certain designated pressures by location.

Weather Forecasting

Good weather forecasting is essential to accurate gas load forecasting, especially when maintaining system load factors in the range of 95% or higher.

At Northwest Natural temperatures and millibar (atmospheric pressure) readings over a 24-hour period, taken at given points on the system, are input to the computer. There they are processed through a series of equations that consider 23 years of weather history. The result is a printout giving a forecast of minimum and maximum temperatures expected for the next 24 hours.

Gas loads and temperatures for a 30-day period are stored on the system's direct access disk file. Using this historical information and projected temperatures, the computer can forecast daily system gas requirements.

The computer also allows more accurate record keeping for gas curtailments.

Much improved management information is another benefit which Northwest Natural Gas has derived from the new system. Once a day the computer summarizes the data which it has logged, and produces a management information report which shows the purchases and sales of gas for the entire system over a 24-hour period.

Looking Ahead

The computer also is used to make gas load studies and long-range projections of gas requirements, which provide excellent tools for management's use in evaluating load growth on the system.

The IBM 1800 system will produce a printout summarizing all important pressures on the system. Here gas control supervisors George E. Richardson Jr. and Woodrow J. Wright inspect a pressure summary.

A history of the hourly flows for each gate station is maintained in computer files and, by normalizing the data to a 20-year average temperature base, it can be projected with budgeted loads or forecasted increases for the next year's requirements.

C.A. Roberts is manager of the Gas Control Department for Northwest Natural Gas Co. in Portland.

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Guide Locates Technical Data

SAN FRANCISCO – Ever get the feeling that the technical information you want is available – somewhere – but you don't know where to begin to look for it?

A Guide to Locating U.S. Government Technical Information, Technology and Patents has been published by TTA Information Services Co., 4 W. Fourth Ave., San Mateo, Calif. 94402. The book describes the technical information activities of 24 U.S. agencies and notes 71 publications and information services programs available to the general public, the firm said.

Included among the agencies are the Superintendent of Documents, U.S. Government Printing Office, Library of Congress and the Department of Commerce.

The guide also gives details on "various data services designed to spur technology transfer and utilization," as well as descriptions of general policies on patents and lists of Nasa patents available for licensing.

The guide includes a list of U.S. Patent Depository Libraries.

The book is available for $15 from TTA Information Services Co.

Soviet Traffic Center To 'Start' Next Year

Novosti Press Agency

MOSCOW – The Start project, an automated traffic control system planned for this city, was recently approved by a commission of experts from the State Building Committee of the Russian Federation. Construction of the computer control center is slated to begin next year.

As part of the Start system, special underground sensors at intersections will record and transmit all data on the number of cars, and the direction and intensity of traffic to computers. The computers will process this information and directly control the traffic with the aid of street lights and directional signs.

Special TV cameras will be mounted at crossings. Operators sitting in a control room will monitor the traffic and note the license numbers of cars that violate the law.

Illuminated diagrams in the center will give a complete picture of traffic flow with special diagrams devoted to the most heavily traveled areas.

The Start computers will also be designed to respond to emergency cases such as the movement of fire engines and ambulances.

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Legal Activities File May Aid Mich. Courts

ROCHESTER, N.Y. – The State of Michigan is using The Lawyers Co-operative Publishing Company's computer phototypesetting service to transcribe and publish a record of all legal activities of that state, in an effort to speed up the traditionally slow judicial process.

Under the new system, courts in Michigan send typed transcripts to the computer center in Rochester where they are entered on disks through an IBM 370/145.

An edited tape produced by the computer is used to produce the final camera-ready copy for publication.

Legal Footnotes Added

Lawyers Co-operative is responsible for all printing, type composing and also adds the legal footnotes.

As a by-product of this service the firm is constructing a data base for on-line interactive referencing of court cases.

The need for the computer publishing service arose from the inability of court systems to incorporate past cases into the body of the law. The time wasted on paper work is one of the major causes of delays in trials and the unresponsive operation of the legal system, according to a Lawyers Co-operative spokesman.

DP, Telescope Map the Sky

Special to Computerworld

SYDNEY, Australia – A large radio telescope constructed by members of the School of Electrical Engineering of the University of Sydney uses a computer to map the part of the sky to which the antennas are directed.

The telescope, it is claimed, will provide 10 times more detailed information about radio sources in the Southern sky than any other telescope in the world.

Many Small Antennas

The instrument, known as a "synthesis" radio telescope, uses a large number of small antennas to receive the radiation from astronomical objects, feeds this energy to an electronic receiving system and then to a computer which converts the received energy into a map of the part of the sky at which the antennas are directed.

The signal from the antennas is fed by underground cable back to the central receiver and an integrated signal is recorded every minute on tape. The signal is then sent through a telephone line to the university where it is fed into a PDP-11. The computer uses a number of complex programs to turn this information into a map of the region under observation.

Profits Increase 25%

Food Chain Brings Inventory, Costs Under Control

By Royce R. Shafter
Special to Computerworld

FORT WAYNE, Ind. – Within a six-month period, Lucky Steer Steak Houses slashed food inventories at its 19 restaurants by 25%, while sales volume climbed 34%, leading to a profit increase of more than 25% for the period.

Much of the credit for this impressive performance goes to our computerized inventory control program, which we installed specifically to control food and labor costs.

The system tracks food stocks and usage at individual restaurants by class and item, calculates variations in item usage and pinpoints overstocks. The net result is lower average inventory, reduced pilferage loss and less waste from overportioning or spoilage.

With food and labor costs our primary target, we are putting more applications on our small computer. The IBM System 3/6 handles the payroll processing for 600 employees; handles accounts payable for more than 700 suppliers; accounts for daily cash receipts from all 19 restaurants; prepares profit and loss statements for individual locations; and prepares corporate balance sheets.

Even more important than its operational versatility is the computer's contribution to better management at all levels – headquarters, field supervision and individual restaurants.

Inventory Control

Computerized inventory control applies to all 19 fast food restaurants, and to each of some 130 product items – from salad dressings to T-bone steaks, poultry to fish, condiments to carryout paper containers.

The vital control element is a master file record which continually updates current sales, replenishment purchases and stock levels – headquarters, field supervision gory and by item.

Every Sunday evening, the restaurant managers take a physical inventory of on-hand foods and supplies. They enter the item-by-item totals on a preprinted form and the completed inventory form is mailed to our headquarters here to become the key input for the inventory control system.

The managers report the week's purchases by mailing in the suppliers' purchase invoices. Cash register receipts, denoting sales, are sent in daily, along with notifications of bank deposits and any cash disbursements for such things as emergency supplies.

The report breaks down the store's inventory by nine product categories – meats, salads, dressings, potatoes, breads, beverages, desserts, paper items and condiments. It shows, for each item within each category, the total cost of the item; percentage of item sales to total sales; broken and whole case inventory; purchase quantity; usage for the current week and the four week average; dollar variation between current and average; and the number of days' supply of the item on hand.

Category totals are also provided and a final summary section showing the manager his total sales for the week, total inventory value, total food cost and average usage.

This report gives managers all the information they need to gear inventories to usage patterns, react to overstock or short supply situations, and pinpoint the problem areas where excessive variations in usage would indicate pilferage or overportioning.

Inventory improvement as a result of the control report has been dramatic. For example, one of our Lucky Steer units showed a total inventory value of $2,900 the first week the computer reporting system went into effect. Four weeks later, that restaurant's inventory was down to $1,500. Average reduction in inventory for all units in the chain is better than 25%. Future plans call for the computer to forecast requirements for raw food purchases and commissary production on a day-to-day basis, with the forecast keyed to current restaurant stock levels and food usage patterns.

Payroll System

The computer is also proving a tremendous time saver in its payroll application.

Under our old system, the restaurant managers had to assemble and total up time card data for each employee, calculating hours and extending by rate – a task that required up to six hours of the manager's time each week.

Now, each employee gets a computer-produced weekly time card with space for clock in-and-out times for each day of the week. The manager collects these at the end of each week, and sends them in to headquarters.

The system edits the data as it is being keyed in for valid identity codes, and for unreasonable or obviously errant time entries, updates the employee's master file record, produces a payroll register, and prints the paychecks.

The computer also produces a payroll summary for store managers showing rate and hours for each employee, total hours worked, gross pay and bonus amounts, and flags any employee working more than 40 hours for the week.

Another important management report is the "hours graph." The "hours graph" breaks each day of the week down into four time segments and using data from both the payroll and inventory routines, shows the total employee hours worked in each of the time segments, the number of employees at work and the labor cost.

It then provides the sales for the time period and the percent of labor cost to sales.

Ours is a totally cardless system. Data is keyed in directly on the System/3's console, and both master record files and the control programming itself reside on magnetic disks under direct computer control.

The computer has moved swiftly into the mainstream of Lucky Steer Steak House operations, and is slated for a much bigger role in the months ahead.

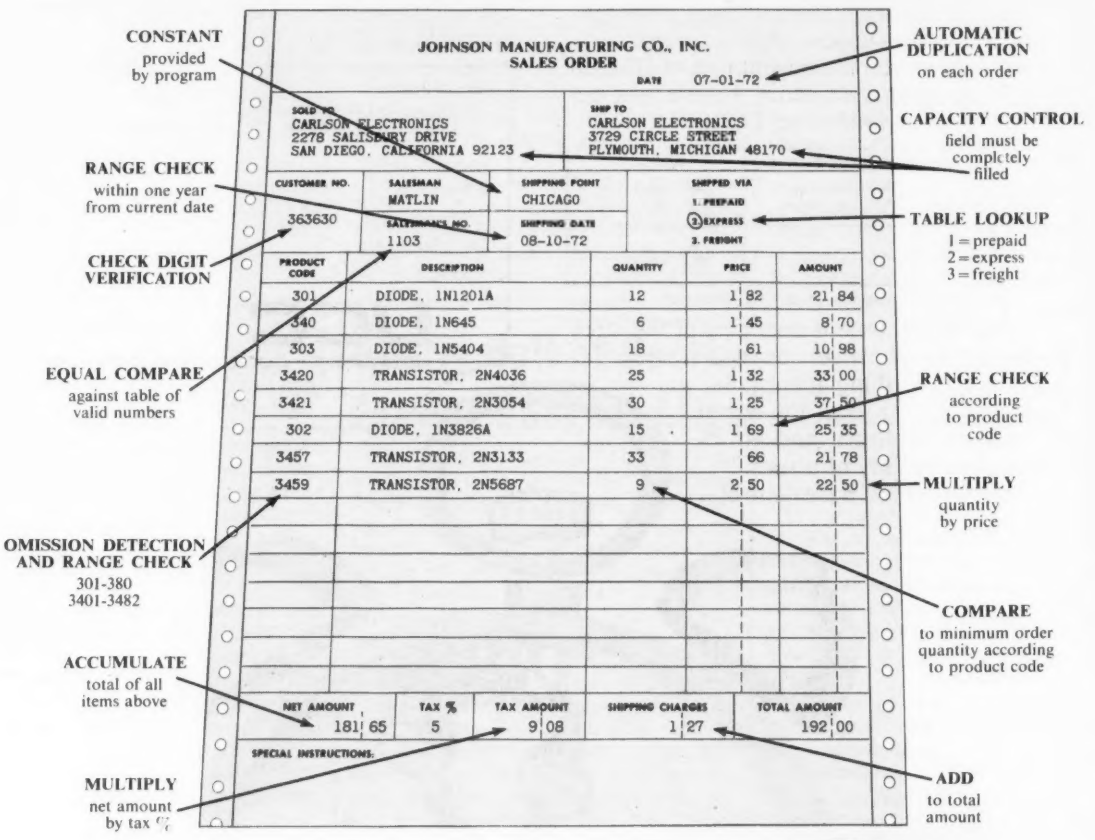
Royce R. Shafter is secretary-treasurer for Lucky Steer Steak Houses, Fort Wayne, Ind.

Recycling Rewarded

BOULDER, Colo. – A U.S. Department of Commerce Boulder Laboratories employee was rewarded recently for her suggestion to recycle computer printout paper.

Sandra Danielson's suggestion resulted in the collection of 40 tons of printout, 80% of which was recycled.

HERE'S WHY THE SYCOR 340 IS SO POPULAR FOR ORDER ENTRY.



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Users Must Take Hard Look at COM Trade-Offs

By Ronald A. Frank
Of the CW Staff

For both the prospective and current COM user, there are many trade-offs to consider that directly affect the efficiency of a microfilm operation.

A recently released Department of Defense standard has set 48x reduction as the microfilm standard but few systems can handle this reduction rate. Most of the current systems handle 42x or 24x.

One advantage of the 48x reduction specification is that the user gets about 50 more frames on a fiche, according to Jim Martin, vice-president for Quantor. With the better packing density there are "substantial savings" for the user, Martin said.

Another area that needs improvement is the availability of a good duplicator. Current models sell for about $20,000 and lease for about $1,000/mo. A better quality duplicator costing about $10,000 or $12,000 or leasing for about $700/mo would make COM systems more attractive to users, according to some experts.

"If we get a good low-cost duplicator, there won't be any roll film users left," is the way one observer explained the situation.

There are also potential problems with the films used with COM. Most current systems use diazo-type film which requires ammonia salts for processing. The ammonia has to be vented somewhere near the COM facility and often there are unpleasant results.

One COM expert said he would not be surprised to see the U.S. Government clamp down on the ammonia fumes entering the air. If this happens, the use of vesicular films which are processed with heat may be the answer. Up to now, the vesicular films have been more expensive than the more popular diazo kind.

Archival Qualities

While many COM users are only interested in immediate usage of their film, some also look at the archival qualities. This refers to the ability of the filmed output to retain its legibility after years of storage. There are no fixed standards on archival properties, but some vendors claim their film will still be readable after "hundreds of years."

While service calls on COM systems are becoming more infrequent as system reliability increases, this is still a sensitive area for most users, especially those with on-line COMs.

"These users don't have paper anymore for their major output requirements. They have to meet their schedules and when business records have to get out, they need service," Martin said.

Many users with on-line systems look on the COM as a CPU peripheral and expect it to be cared for with the same dispatch. One problem in this area is that the vendor is film-oriented, rather than CPU oriented. For the users this can often be translated into 24-hour delays on a service call.

NCR recently agreed to have its field force maintain Quantor equipment. If other vendors recognize that the COM user needs computer-type attention and maintenance, users' hesitancy about support may be greatly decreased.

In conjunction with the computer image attached to COM, one firm actually compares its devices with other peripherals. "Except for audio response, the CPU tells it like it is only when humans can see the output," according to Dave Davison, president of Zytron Inc., which operates COM service bureaus and also provides in-house services direct to users.

Welcome Alternative

"COM, with its electronic printing speed and low systems cost/bit, has provided a welcome alternative to paper and on-line systems and merits consideration every time we think of computer output," Davison said.

A major factor in enhancing the original benefits of COM which offers higher speed output and low storage and distribution costs is the recent development of microfilm-based "terminals" which allow "real-enough time" access to very large data bases at a fraction of on-line costs, Davison said.

As an example, a microfilm terminal using microfiche produced directly from a COM recorder can provide the equivalent in data storage capacity of 45, 2316-type disk files. This unit which leases for $350/mo, provides five-second retrieval to any item in the data base and can be operated under computer control, he said.

"Automatic retrieval devices like this coupled with on-line CRTs can greatly enhance the use of on-line systems by reducing data storage and transmission costs through the use of COM 'optical read only memory,'" according to one COM consultant.

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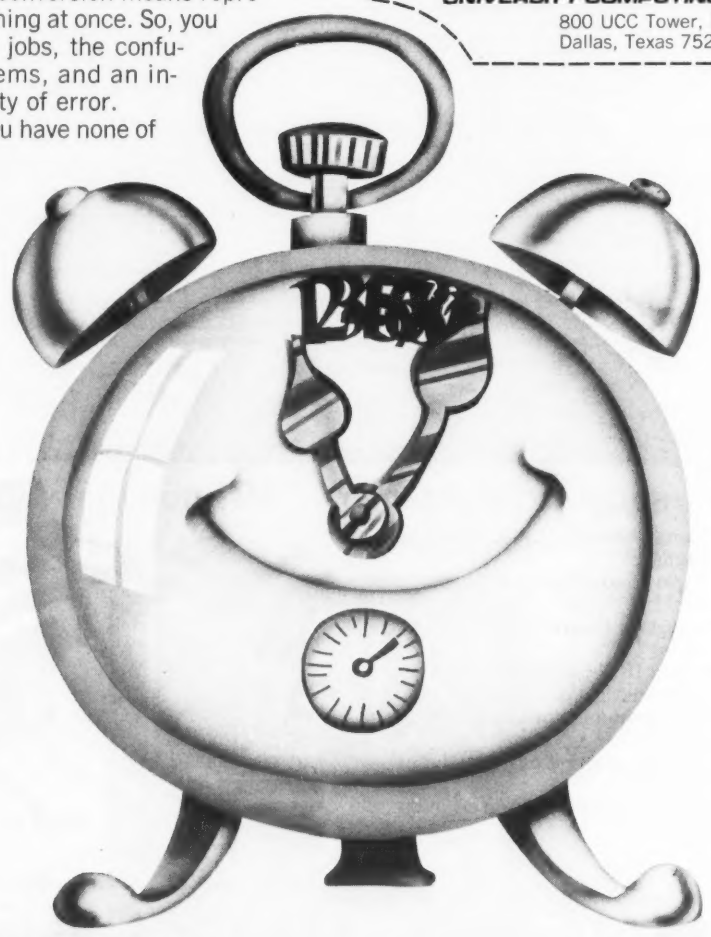

Bulgarians Testing Computerized Farms

NOVI KRICHIM, Bulgaria – Use of computers in agriculture is being tested here on the 31,000-acre Lenin Agro-Industrial Complex, as part of an effort to concentrate production of goods and reduce the manpower needed on the farms.

About 170 complexes, averaging 54,000 acres each, have been started in Bulgaria during the last few years, and plans call for agriculture to become specialized, with, for example, 16 of the complexes concentrating on broiler production, while 43 others specialize in raising pigs.

Several of the complexes are reportedly being supplied with small computers to aid in operations management. Field radios and closed-circuit TVs have been installed in 24 of the complexes to facilitate assignments of men and machines.

CAI Assists Teachers In Identifying Disabilities

HOUSTON, Texas – Since last November, 400 Houston School District teachers and administrators have been taking advantage of a three-month computer-assisted instruction course designed to assist them in identifying learning disabilities in children.

A 40-ft-long van from Pennsylvania State University houses $650,000 worth of tutoring equipment, including 15 individual teaching stations. Each station is a computer terminal which projects written and illustrated information about child behavior upon two viewing screens.

The teacher-student interacts with the computer, using a keyboard and a pen-like pointer. A listening device completes each station.

Dr. J. Don Boney, chief instructional officer, attributes two values to the course: "It will sensitize teachers to the characteristics of children with learning and language disabilities." Secondly, it will let administrators see the educational possibilities in computer technology.

CI Notes

Japan Relaxes Imports

TOKYO – The Ministry of International Trade and Industry has published a revised schedule of computer peripheral equipment that can be imported into the country.

Included in the revision are 51 types of equipment and a total of 505 models, compared with 332 models within 39 categories on the original list.

The list, which is designed as a guide for customs officials, is not designed to be comprehensive, but any firm wishing to export equipment into Japan will have to prove to the officials that its equipment falls within the guidelines, according to the U.S. Department of Commerce which released the guidelines.

IBM Rebuffed on Stock

SYDNEY, Australia – IBM has been rebuffed in an attempt to list its shares on the Australian stock exchanges. Current Reserve Bank restrictions will not allow the firm to list its stock here, according to Derek J. Docherty, controller for IBM Australia.

However, if the restrictions were altered, Docherty said, IBM would "welcome the opportunity" to have its stock listed on the exchange.

Supershorts

Data General Corp. has delivered its 4,000th minicomputer, a Nova 800, to the Asheville/Buncombe County Metropolitan Planning Board in Asheville, N.C.

– – –

DPF Inc. announced that all lawsuits pending between it and Marshall Industries have been settled. The litigation arose out of the parties' failure last year to conclude a proposed financing by DPF of Marshall's Data Systems Division.

– – –

Robert D. Klages, legal counsel to the marketing and services operations of Univac, has been named chairman of the Computer and Business Equipment Manufacturers Association Trade Committee.

– – –

Shipments of intelligent communications terminals from Sycor have exceeded a rate of 100 units per week, and are continuing to rise from this level, the firm said.

– – –

Informatics Inc. Mark IV File Management System has been granted a patent by the British Patent Office. It is believed to be one of the first British patents issued for a computer software system developed by a U.S. firm.

– – –

Interdata has signed a three-year OEM Purchase Agreement with Servo Corp. of America. Servo's first orders, under terms of the agreement, involve 13 New Series Model 50 communications processors.

To Promote Competition

NBS Seeks Release of Interface 'Specs'

By E. Drake Lundell Jr.
Of the CW Staff

GAITHERSBURG, Md. – Computer manufacturers should be encouraged to release at least tentative interface specifications upon product announcement, according to a recent draft study on "Means of Achieving Interchangeability of Computer Peripherals."

Prepared by the Center for Computer Sciences and Technology of the National Bureau of Standards, the study recommended that no interface standard be established for all peripherals but that standards be developed in specific areas (see story on Page 1).

At the same time, it urged a wider dissemination of interface specifications prior to delivery of products to increase competition. It also urged federal agencies to make wider use of the present de facto standards (IBM specifications) in order to increase procurement competition.

"The key to achievement of interchangeability of computer components is the availability of manufacturers' specifications describing the interface between his equipment units within a computer system," the report noted.

"The disclosure of these specifications in itself, with no accompanying interface standards, is sufficient to permit competition among component (e.g. peripheral) manufacturers.

"Furthermore," the study added, "any development of realistic interface standards is absolutely dependent upon the availability of manufacturers' interface specifications."

A Bit Reluctant

The study said there was a reluctance on the part of the mainframe makers to disclose such standards "because of the obvious resultant increase in competition to their own products."

The result has been that "each CPU manufacturer has developed concurrently his interface designs and definitions and has in some cases kept their specifications secret for his own competitive advantage."

This in turn results in "a proliferation" of interface specifications and has limited the interchangeability of computer peripheral equipment, the study charged.

But even though manufacturers have not done so in the past, the study said "the disclosure of specifications is feasible for equipment manufacturers. Further, disclosure is essential at time of first delivery, and is feasible at first offering of equipment using the interface, if proper marketplace behavior is being followed."

Such disclosure upon product announcement "does not preclude later changes to an interface definition by the disclosing manufacturer," the report stated, adding that "such disclosure in no way places responsibility on the releasing manufacturer for subsequent rigid adherence to the specification in questions.

"Peripheral manufacturers have shown the capability of sufficiently rapid response to minor evolutionary changes in specifications to maintain their competitive position.

"Changes in interface specifications would simply necessitate accompanying changes in released interface specification documentation," the study said.

This early release of specifications would result "in earlier and more healthy competition in the peripheral market. Further, this competition in peripherals would benefit the CPU competitors of the dominant company in that customers would have a wider selection of peripherals and thus their CPUs or computer systems would be more attractive."

At the present, NBS noted, "the growth of IBM to a dominant position in the CPU marketplace has made its interface specifications of particular value to the peripheral industry because of the large number of potential customers for peripherals that can be interconnected to IBM CPUs.

"Because of IBM's dominance in the marketplace," NBS said the IBM interface specifications have become the present de facto standards in the marketplace.

"This has resulted in additional choices of peripherals for the federal customer using IBM CPUs and has provided for more competition in the peripheral market."

IBM Faces Busy Court Calendar, Telex Trial Set for April 16

TULSA, Okla. – Telex has won the race to be the first firm presently suing IBM to have its cases heard in court.

The Telex vs. IBM case will go to trial April 16 here under the direction of Judge A. Sherman Christensen, U.S. senior district judge from Salt Lake City, Utah.

The other pending private case against the industry leader, the one filed by Control Data Corp. over four years ago, will go to court Nov. 5 under Judge Philip Neville in Minneapolis.

Meanwhile, no date has been set for the biggest suit of them all, the government's case against IBM. But the government has filed an appeal to an appeals court ruling that would keep 1,200 IBM documents out of the case.

The Telex suit against IBM sticks specifically to the issue of the independent peripherals producers, unlike the Control Data case which covers IBM's actions across the board in the computer industry.

The suit claims that IBM monopolizes the interstate and foreign computer market, including the peripherals segment of that market, and that IBM priced certain 360 and 370 equipment in order to eliminate Telex from competition in the peripherals market.

The suit asks the court to enjoin IBM from engaging in those practices that would eliminate Telex as a competitor in the peripherals market.

The alleged practices include the extended-lease plans on some 360 and 370 peripherals and the IBM practice on the 370 of integrating peripheral controllers into the mainframe of the computer system.

In addition, Telex wants the court to restructure IBM in order to permit increased competition in the computer business.

In the other recent antitrust action, the Justice Department appealed a ruling of a court of appeals that barred the Justice Department from using documents that IBM claimed were privileged and that set up a special judge to review the contested documents in the case to see if they really were of a confidential nature.

Justice said it wanted to present "matters of law and fact" which were overlooked by the appeals court in its initial ruling.

In addition to the 1,200 documents that IBM has already identified as privileged, the Justice Department said IBM now might try to claim that an additional 90,000 documents were privileged, which could bog down the case for a long time.

Nearly Half of Booths For NCC Booked: Afips

NEW YORK – Almost 50% of the booths available for the 1973 National Computer Conference and Exposition scheduled for June 4-8 at the Coliseum here have been booked, the American Federation of Information Processing societies (Afips) has announced.

During the recent Fall Joint approximately 70 organizations reserved more than 320 booths, the NCC sponsor announced, accounting for 46% of the planned capacity of the show.

The 70 firms and 320 booths reserved represent approximately 80% of the 408 booths taken for the Fall Joint, the organization said, indicating sales were off to "an extraordinarily fast start." The organization predicted the turnout for the New York show would top 30,000.

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Dual CPUs

Microdata Heralds Communications Units

IRVINE, Calif. – Microdata Corp.'s 1600/60 Communications Processor combines dual CPU hardware with communications handling firmware. When combined with Microdata's full line of communications interfaces and software packages, the processor allows complete programmable communications systems to be assembled, the firm said.

Each of the 1600/60's independent CPUs contains a separate I/O system and microprogram control memory.

One CPU, a general-purpose computer, is dedicated to system control, control of peripheral devices and message processing. The second CPU, the Communications Operating Module (COM-60), services up to 256 synchronous and/or asynchronous communications channels operating full or half-duplex with throughput up to 40,000 char./sec.

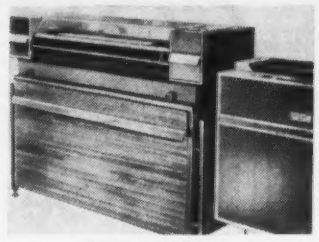
New OEM Products

Price for a typical system with 64 asynchronous modem interfaces (103 or 202), 32K bytes of core memory and cabinets, is $29,000 from 17481 Red Hill Ave., 92705.

Drum Plotter Makes Scene

ARVADA, Colo. – The 8000 series of high speed drum plotters, which can create graphic images in ball point pen, liquid ink or wash emulsions has been announced by Auto-Trol Corp.

Available in 14 in., 30 in. and 36 in. versions with plotter step sizes of .005 in., .010 in., .1mm and .2mm, the systems are available in on- or off-line configurations with interfaces and mag or paper tape units. Prices range from $6,000 to $13,000.



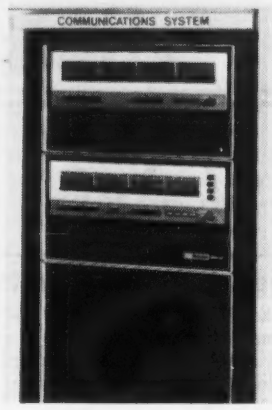
Auto-Trol 8000

Other New Products

The PR2000, a self-contained system for high-speed measurement and display of machine tool positioning, is available from Sperry Vickers Umac Division, Burlington, Vt.

– – –

The RL-2CW discrete, solid-state LED lamp with a metal collar and 5 in. leads from Litronix, Cupertino, Calif., mounts in a 3/16 in. hole and is inserted from the front. The price is $1.70 in quantities of 100 through 999.



Microdata 1600/60

– – –

Cambridge Thermionic Corp. (Cambion) offers a family of random access memory cards that directly interface with standard Cambion DTL (780) and TTL (783) logic cards. Memory capacity ranges from 256 words by 8 bit to 4K words by 1 bit.

– – –

The PC-mounting Series 780 Synchro Data Modules from North Atlantic Industries, Inc., Plainview, N.Y., provide a typical per-channel conversion cost of $650 at the 14-bit level of resolution.

– – –

A new series of data scanners capable of sampling outputs from as many as 1,000 sensors has been developed by Consolidated Controls Corp., Bethel, Conn.

– – –

A printed circuit card enclosure is available with card spacing, connector mounting centers, overall rack size and other key dimensions to specific user requirements from Vero Electronics, Hauppauge, N. Y.

– – –

A new series of sub-modular DC power supplies from Powertec, Inc., Chatsworth, Calif., provides a "building block" concept which combines the benefits of multiple-output design and single output modularity, the firm said. Prices run from $15 to $40 in lots of 100.

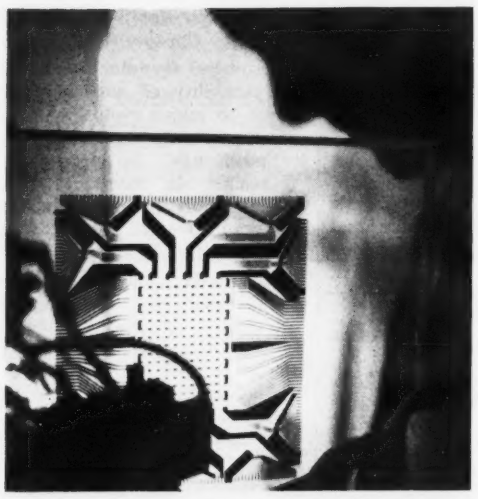
– – –

A breadboard for using dual-in-line components for interfacing I/O devices with Digital Equipment Corp. computers is available from Douglas Electronics, Inc., San Leandro, Calif.

– – –

A family of four LED numeric displays from Litronix, Cupertino, Calif., utilizes a "bubble top" integrated lens construction similar to that developed for smaller handheld calculator displays. This allows minimum use of Gallium Arsenide Phosphide material, which is then magnified to the specified digit height.

A lot of companies have inventors. But only one communications company has Bell Labs.



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Industry Said to Agree on Problems; Seeks Methods to Restrict IBM's Power

SAN FRANCISCO – The computer industry is capable of presenting a common set of proposals about how to solve the industry's problems, because "their problems stem from a common cause – IBM's dominance," Dan McGurk, president of the Computer Industry Association, told security analysts here recently.

"When you get down to the nitty gritty, the executives agree with one another about what the industry should ask for," McGurk said.

"The big problem is how to restrict IBM's power. And they take an industry outlook," he added.

McGurk has been touring the country speaking with executives of various computer industry firms to try to hammer out a proposal to submit to the Justice Department, giving the unified industry outlook on what relief can be expected from the antitrust action against IBM.

"I'm amazed at how almost uniform the outlook is about what is desirable. You might not think they will agree. But our experience is that they do," he told the analysts.

Regarding either the breakup of IBM or some form of government regulation over the firm, he said: "We have to ensure . . .that it be done sensibly, with input from the entire industry. That's because any solution will affect not only the parties to the suit but everyone."

McGurk pointed out that IBM's market dominance had the effect of drying up capital for other firms in the business and that this has a greater adverse effect on the industry than does IBM's ability to increase its customer base.

The breakup of IBM as proposed by the Justice Department might not have an adverse effect on IBM stockholders, he said, noting that a similar breakup increased the value of Standard Oil in 1972.

At present, the CIA is attempting to set up a unified industry position on an early relief proposal to be submitted to Justice. This would cover what the industry would like to see the Justice Department ask for in a preliminary injunction.

The injunction would be in effect while the full antitrust case is being tried.

Removal of Trade Bars Sought

WASHINGTON, D.C. – Both domestic and foreign impediments to sales of U.S.-made computers overseas should be eliminated, according to a special advisory committee established by the Department of Commerce.

"This industry neither seeks, nor needs, active federal government assistance by means of subsidies, protective trade barriers, or the like," the ad hoc group said in a recent report.

"We do require the lessening, and eventual removal, of unrealistic and unnecessary domestic and foreign restrictions on the industry's export capabilities," the group added.

The report was published by the National Export Expansion Council's Industry Advisory Committee on Office Machines and Computers.

The report noted that during the decade of the 1960s U.S. exports of office machines and computers increased eightfold from $208 million to $1.6 billion.

But, the report noted, the annual rate of increase in exports of computers and related equipment as well as office machines fell from 43.7% in 1970 to .2% in 1971, a sign of possible trouble ahead.

The major U.S. barriers against trade currently consist of restrictions on the type of computer systems that can be sold to Eastern European and other Communist-bloc countries.

The committee was established by the council to provide industry advice to Secretary of Commerce Peter G. Peterson on how best to increase exports.

Foreign Orders & Installations

The Netherlands Social Fund for the Building Industry has ordered a Univac 1106 with 86 terminals for the administration of benefits for workers in the Dutch building industry.

Digital Equipment Corp. has delivered a dual-processor Decsystem-1055 to Plessey Telecommunications in Liverpool, England, for software development, testing and exchange interface integration prior to installation at the telephone exchange in London. When operational in late 1974 the system will handle international accounting and traffic analysis for up to 144,000 call/hr.

The South African Coal, Oil and Gas Corp. has ordered a Univac 1106 for use in linear programming, production statistics, inventory, accounting, costing and scheduled maintenance.

Two West German health organizations have ordered 65 Datapoint 2200 intelligent terminals from Datapoint Corp. through its distributor, Gier Electronics GmbH. The firms will use the systems to collect claims information for citizens eligible for benefits under the national health insurance program.

Charles Early & Marriott (Witney) Ltd., a blanket manufacturer founded in 1669, has ordered a Univac 9200 for payroll, invoicing and order control applications.

The Nationwide Building Society, a large British mortgage loan institution, has ordered a Univac 1110 system to provide for a terminal network as well as on-line inquiry of members' accounts.

Kay and Co. and British Mail Order Corp. plan to install up to 1,000 Plessey Co., Ltd. CRT data terminals in on-line systems to expedite processing of customer orders. Bunker Ramo provides the terminals to Plessey under an OEM agreement.

General Motors, Oshawa, Canada, has ordered the Project Control/70 package from Atlantic Software Inc.

The Sao Paulo, Brazil, stock exchange has installed additional T-Scan Ltd. terminals to handle mark-sense cards.

The Union Bank of Switzerland, Zurich, has ordered 45 Datapoint 2200 intelligent terminals from Datapoint Corp.'s Swiss distributor, TRW International SA/TRW Communications. The terminals will be used to establish a central information file.

Recognition Equipment Corp. has shipped the Postal Address Reader-Indexer System (Paris) for installation in France.

Pourquoi est-ce que je dois changer de langue? Il m'a pris dix ans pour apprendre celle-ci.
(Why should I switch languages? It's taken ten years to learn this one.)

Wie kommt es dass der Preis des EDP ist immer höher und höher?
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Effective COM Evaluation

Comparative Cost Analysis Assures Efficient System

By Joseph L. Kish Jr.
Special to Computerworld

Approximately 10 years ago, following the development of low-cost reader-printers, conventional rotary camera-produced microfilm was touted as the panacea for all record-keeping problems.

Merely reduce the hard-copy records and forms to 16mm microfilm and – voila! – the files become more manageable, require less space and become virtually tamper-proof.

Many companies fell for this sales pitch and found – to their frustration and sorrow – that microfilm was far from a panacea. Indeed, while it is true that, in the correct application, microfilm can dramatically slash record-keeping and retrieval costs, it is equally true that its indiscriminate use will impede retrieval and make costs soar.

New Pitch

Today these same companies are being wooed with a new line – convert your bulky computer printouts to an easy-to-work-with, space-saving microfilm format via a process known as computer output microfilm, and save money and increase operating efficiency in the process.

And again, as I have observed among a wide range of organizations, indiscriminate use is often made of this new process. What is needed is a hard look at COM – its costs, limitations and advantages.

Many organizations fail in their eagerness to simplify the problems inherent in retaining bulky computer printout.

COM as Alternative

Put in its proper perspective, COM is merely another way of preparing and distributing computer printout. It provides an alternative to two older methods – hard copy continuous forms and camera-produced microfilm.

The EDP manager contemplating the use of COM should conduct a comparative cost analysis between these various alternative methods to assure that COM will actually be the less expensive, most efficient alternative.

The following format facilitates this cost comparison.

A. Hard Copy Costs

Cost Factor — Cost

1. Forms (number of forms used is average run x cost per thousand forms) . . . . . .$xxxxx
2. Printing (average production time for report under study x hourly computer printer operating costs) . . . . . .$xxxxx
3. Forms handling (bursting, etc.) costs (forms handling time required x hourly forms handling operating costs) . . . . . .$xxxxx
4. Binding, boxing, etc. (number of binders, boxes, etc. x cost per binder, box, etc.) . . . . . .$xxxxx
5. Office storage (cubic feet of space required x current space costs x retention period for the record under study) . . . . . .$xxxxx
6. Transportation to storage (cubic feet of records x cost of transporting to storage) . . . . . .$xxxxx
7. Inactive storage (cubic feet of records involved x annual cost of inactive storage x retention period for the record under study) . . . . . .$xxxxx
8. Destruction (cubic feet of records involved x cost of destruction per cubic foot) . . . . . .$xxxxx
9. Other costs . . . . . .$xxxxx
   a. Mailing
   b. Indexing
   c. Etc.

   These can be determined by such methods as sampling, pilot study, etc.

Total cost of creating and retaining the record in its hard-copy form . . . . . .$xxxxx

B. Conventional Rotary or Continuous Forms Microfilming

Cost Factor — Cost

1. Equipment lease amortization
   a. Camera . . . . . .$xxxxx
   b. Processor . . . . . .$xxxxx
   c. Duplicator . . . . . .$xxxxx
   d. Readers & Reader Printers . . . . . .$xxxxx
   e. File equipment for microfilm . . . . . .$xxxxx
2. Cost of the microfilm (number of pages to be filmed ÷ pages per 100 ft of film (approximately 2,000 pages at a 20:1 reduction ratio; 2,400 at a 24:1 ratio); x cost per 100 ft of roll of film) . . . . . .$xxxxx
3. Cost of labor involved (number of pages to be filmed ÷ rated hourly output for the camera involved x hourly labor rate, including fringe benefits) . . . . . .$xxxxx
4. Costs of chemicals used in processor . . . . . .$xxxxx
5. Cost of producing and destroying the hard copy used for filming (the same costs involved in Section A will be incurred with respect to forms, printing, forms handling, destruction, etc.) . . . . . .$xxxxx
6. Other costs . . . . . .$xxxxx
   a. Mailing
   b. Hard copy prints from microfilm
   c. Cost of duplicate microfilm
   d. Film processing
   e. Etc.

Total Costs . . . . . .$xxxxx

C. COM-Generated Microfilm Costs

I. Via a COM Service Bureau

Cost Factor — Cost

1. Lease or amortization of:
   a. Readers and reader/printers . . . . . .$xxxxx
   b. Duplicators . . . . . .$xxxxx
   c. File equipment . . . . . .$xxxxx
2. COM-film preparation . . . . . .$xxxxx
   (This will be a flat figure that will be quoted by the service bureau)
3. Other Costs . . . . . .$xxxxx
   a. Mailing
   b. Preparation of duplicate microfilm
   c. Preparation of hard-copy prints
   d. Etc.

Total Cost . . . . . .$xxxxx

II. Via an In-House COM Operation

Cost Factor — Cost

1. Lease or rental of:
   a. COM System . . . . . .$xxxxx
   b. Readers and reader/printers . . . . . .$xxxxx
   c. Duplicating equipment . . . . . .$xxxxx
   d. Processors . . . . . .$xxxxx
2. Microfilm (number of pages to be converted ÷ (reduction ratio x 100) x cost per 100 roll of film)
   Note: This will give a reliable estimate of the cost of the total rolls of microfilm required) . . . . . .$xxxxx
3. Film Processing (total footage of microfilm rolls to be processed ÷ rated hourly speed of film processor involved x labor cost per hour, including fringes)
   Note: If a commercial processing laboratory is used obtain the figure by multiplying the number of rolls involved by the processing cost per roll . . . . . .$xxxxx
4. Disk/tape conversion (hours required for this conversion x average hourly conversion costs) . . . . . .$xxxxx
5. Other Costs . . . . . .$xxxxx
   a. Mailing
   b. Preparation of duplicate microfilm
   c. Preparation of hard-copy prints
   d. Etc.

Total Costs . . . . . .$xxxxx

Once the relative costs of preparing and distributing the computer-generated data by the forementioned alternatives have been determined, the EDP manager can then proceed with his systems analysis to assure that each alternative will facilitate, rather than impede retrieval.

Joseph L. Kish Jr. is president of Iron Mountain Information Management, Inc. of New York City. He is author of "Microfilm in Business," published by Ronald Press, and teaches courses in microfilm systems at New York University.

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MINNEAPOLIS	Branch Sales Manager
COLUMBUS	Branch Sales Manager
ATLANTA	Sales Representative
WASHINGTON, D.C.	Systems Engineer
SAN FRANCISCO	Branch Sales Manager
NEW YORK CITY	Systems Engineer
ANN ARBOR (HEADQRTRS)	Product Manager
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	Systems Engineer
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Product Specialist

Graduate engineer desirable but not mandatory. Should have had considerable exposure to electronic hardware design and development. Should have familiarity with electronic manufacturing. Will be responsible for technical support of products sold to OEM customers.

Manager – Training & Documentation

Minimum of 3 years experience in EDP related training and documentation with a background in programming. Will organize and supervise customer training programs. Will write, edit and supervise production of operators, programmers, and reference manuals for Model 340 and future products.

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REDONDO BEACH, Calif. – TRW Credit Data has appointed a full vice-president to director of consumer relations and quality assurance, and increased the department's staff.

"This function of quality assurance includes continuous inspection of our computer system to find new ways of increasing our efficiency in processing credit data," Edward S. Brennan, vice-president and general manager of TRW Credit Data, said.

Larry L. Jensen was named to the new position.

"We are taking specific steps to ensure that the information we receive is accurate, and we have introduced new procedures for investigating and verifying information when it is disputed by the consumer," Brennan added.

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Survey Finds Buying Influence At DPMA Rises

PARK RIDGE, Ill. – The level of buying influences of attendees at the 1972 Data Processing Management Association (DPMA) exposition was up about 7% over the year-earlier show, according to an audience survey.

The survey, prepared by Exhibit Surveys and released by the DPMA, also showed that buying plans of the visitors were up 10% over the buying plans shown in the 1971 exhibition and crossed all areas, including computer systems, data processing accessories, peripheral equipment and computer-related services.

More Supervisors

The study also found that 65% of the attendees at the conference held managerial or supervisory positions – up 5% over the 60% in such positions a year earlier.

The number of college-educated visitors was up 6% over 1971, and most of the students attending the 1972 convention also held full-time jobs.

The 1973 DPMA international conference and exposition is slated for the Conrad Hilton Hotel in Chicago June 26-29.

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Photo courtesy of Ocean County College, Toms River, New Jersey

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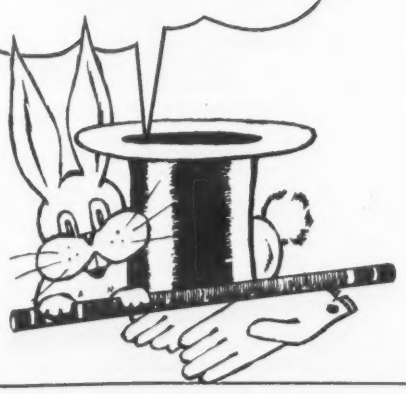

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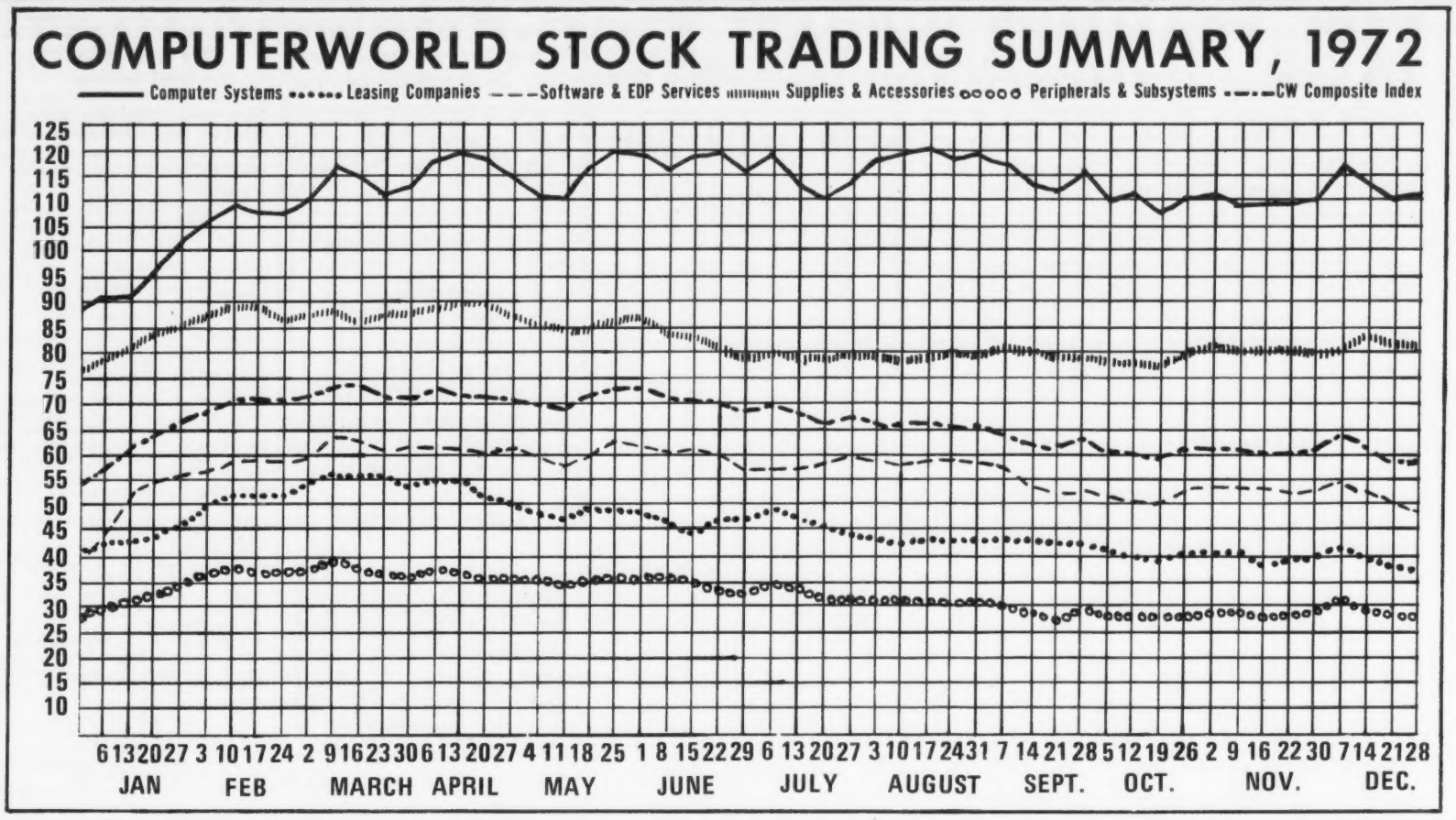
COMPUTERWORLD STOCK TRADING SUMMARY, 1972
Computer Systems
Leasing Companies
Software & EDP Services
Supplies & Accessories
Peripherals & Subsystems
CW Composite Index
125 120 115 110 105 100 95 90 85 80 75 70 65 60 55 50 45 40 35 30 25 20 15 10
6 13 20 27 3 10 17 24 2 9 16 23 30 6 13 20 27 4 11 18 25 1 8 15 22 29 6 13 20 27 3 10 17 24 31 7 14 21 28 5 12 19 26 2 9 16 22 30 7 14 21 28
JAN FEB MARCH APRIL MAY JUNE JULY AUGUST SEPT. OCT. NOV. DEC.

Stocks Generally Consistent, But a Few Stand Out

NEWTON, Mass. – While the stock trading index for the year shows a general consistency in the values of the stocks in each of the five sectors, a closer examination reveals there were some killings to be made in the market, and also some baths to be had.

The mainframe sector began the year on the CW stock index at about 87 and finished at 111, having hit 120 during the spring and summer.

Prices of mainframe stocks generally started out near the high point of their range for 1971, although NCR and General Automation began 1972 nearer the low point of 1971.

Burroughs was one of the mainframe stock darlings of the year, going from about 154 at the beginning of January, climbing steadily to 163 at the end of March, hitting 182 in June and 223 at the end of September. It finished the year at 213.75.

IBM began at 341, hit a whopping 426 during the year and closed at 399, also a tidy gain.

Honeywell, while it had a fling up at 148.5 at the end of June and reached 170 during the year, finished at 134.25, only 3 points above where it began.

In the mini sector, General Automation soared from 13.5 in January to close at 47, while DEC began at 76.25 and ended the year at 91.25. Data General was another mover, going from 59 to 111.25 and reached 115 during the year.

The software index showed a spread of almost 30 points. It peaked in early March, and then began a gradual slide.

Several companies began at the lower end of the range established the previous year, and tumbled even further through the year. A notable exception was National CSS, which began at 8.75 and climbed to 27+.

Applied Data Research, Computer Sciences, Computing and Software and Informatics all reached lower points during 1972 than in 1971.

On the brighter side, Automatic Data Processing began at the high end of the 1971 scale and kept climbing, from 73.25 to 90+.

On-Line Systems started the year at 10.25 and finished at 24+.

Taken as a whole, the peripherals sector finished where it started, between 25 and 30 on the index. Not many big gainers can be found; but Fabritek and Milgo doubled during the year, but were unable to hold these gains.

The field had a number of firms with substantial declines, notably Ampex, from 14.75 to 6; Calcomp, 19.5 to 10.75; and Mohawk Data Sciences, 22.25 and ending at 11+.

The leasing sector lost some ground in 1972, beginning its composite index about 42 and ending just under 40.

Boothe Computer went from just over 14 to 2+, DPF from 9.75 to 5.5, DCL Inc. from 8 to 2.5.

A couple of firms with strong diversified bases, such as Dearborn-Storm and U.S. Leasing, managed to ride out the year with less fluctuation. Dearborn-Storm began and ended at 20 while U.S. Leasing ranged from 36.75 to 31.

The supplies and accessory sector showed a span of about 15 points during the year, but finished the year at about 82, six points higher than it began.

The CW composite index of all sectors reflected the relatively flat year on the stock market, beginning at about 53 and ending about 59, with a range throughout the year of 20 points.

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TRADE*QUOTES

Computerworld Stock Trading Summary

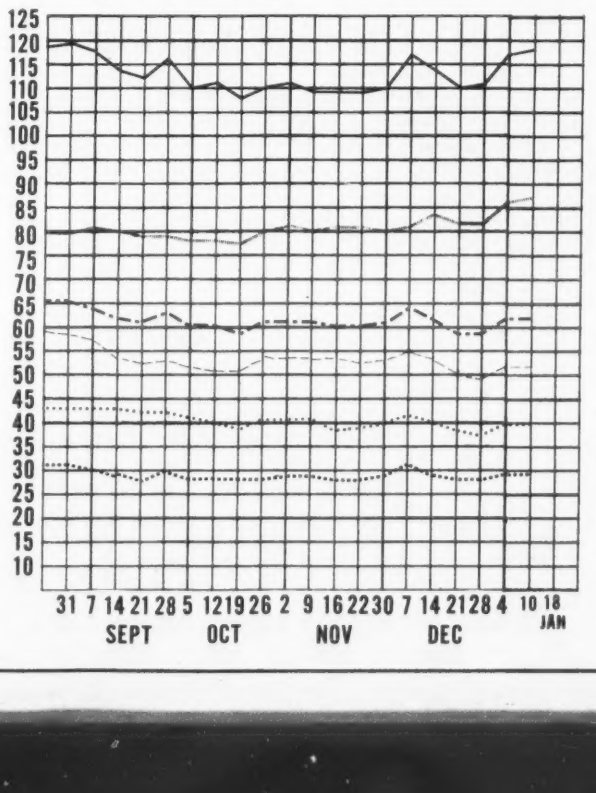
All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

CLOSING PRICES WEDNESDAY, JANUARY 10, 1973

EXCH		1972 RANGE (1)	CLOSE JAN 10 1973	2-WEEK NET CHNGE	2-WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 3	2 1/8	0	0.0
A	APPLIED DATA RES.	3- 7	3 3/4	- 1/8	-3.2
O	APPLIED LOGIC	1- 4	2 3/4	0	0.0
N	AUTOMATIC DATA PROC	72- 99	94	+3 3/8	+3.7
O	BRANDON APPLIED SYST	1- 2	7/8	0	0.0
O	COMPUTER DIMENSIONS	4- 14	4	0	0.0
O	COMPUTER DYNAMICS	1- 4	1	0	0.0
O	COMPUTER NETWORK	3- 7	4	+ 1/2	+14.2
N	COMPUTER SCIENCES	4- 10	5	- 1/4	-4.7
O	COMPUTER TASK GROUP	1- 2	1 1/4	0	0.0
O	COMPUTER TECHNOLOGY	3- 8	2 5/8	- 1/4	-8.6
O	COMPUTER USAGE	7- 14	8 3/8	- 1/2	-5.6
N	COMPUTING & SOFTWARE	14- 28	13 3/4	- 3/4	-5.1
O	COMRESS	1- 3	1 1/8	- 1/4	-18.1
O	COMSHARE	5- 10	7 3/8	- 3/8	-4.8
O	DATATAB	4- 9	4 1/4	+ 1/8	+3.0
O	EDP RESOURCES	2- 8	2 3/4	0	0.0
A	ELECT COMP PROG	1- 5	2 1/4	+ 1/4	+12.5
N	ELECTRONIC DATA SYS.	43- 65	54 1/2	-1 1/4	-2.2
O	INFORMATICS	5- 11	5 5/8	- 1/8	-2.1
O	I.O.A. DATA CORP	1- 3	3/4	+ 1/8	+20.0
O	KEANE ASSOCIATES	4- 7	3 3/4	0	0.0
O	KEYDATA CORP	7- 13	11 1/2	+ 3/4	+6.9
O	LOGICON	4- 9	4 1/2	- 1/8	-2.7
A	MANAGEMENT DATA	4- 10	4 3/4	0	0.0
O	NATIONAL CSS INC	8- 31	30 1/2	+1 1/8	+3.8
O	NATIONAL INFO SRVCS	1- 5	1 1/2	+ 1/8	+9.0
P	ON LINE SYSTEMS INC	8- 28	23 3/8	-1 1/4	-5.0
N	PLANNING RESEARCH	6- 17	6	- 1/8	-2.0
O	PROGRAMMING METHODS	20- 25	24	0	0.0
O	PROGRAMMING & SYS	1- 2	1	- 1/8	-11.1
O	RAPIDATA INC	5- 27	22 1/4	-1 1/2	-6.3
O	SCIENTIFIC COMPUTERS	2- 4	1 5/8	0	0.0
O	SIMPLICITY COMPUTER	1- 5	3 1/2	- 1/8	-3.4
O	TBS COMPUTER CENTERS	3- 6	4	+ 1/8	+3.2
O	TCC INC	1- 3	5/8	0	0.0
O	TYMSHARE INC	7- 11	9 3/4	+ 1/8	+1.2
O	UNITED DATA CENTER	5- 8	5 3/4	0	0.0
N	UNIVERSITY COMPUTING	9- 26	9	- 5/8	-6.4
A	URS SYSTEMS	6- 10	7 3/8	- 7/8	-10.6
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	32- 49	31 7/8	-1 5/8	-4.8
O	ADVANCED MEMORY SYS	12- 23	20	+3 1/2	+21.2
N	AMPEX CORP	5- 15	6 1/2	- 1/4	-3.7
O	ANDERSON JACOBSON	4- 8	4 1/2	+ 1/4	+5.8
O	BEEHIVE MEDICAL ELEC	1- 8	6 1/2	0	0.0
A	BOLT,BERANEK & NEW	5- 21	10 3/4	-1 1/4	-10.4
N	BUNKER-RAMO	9- 14	10	+ 1/8	+1.2
A	CALCOMP	9- 25	11 5/8	- 3/8	-3.1
O	CAMBRIDGE MEMORIES	9- 15	14 3/8	+ 7/8	+6.4
O	CENTRONICS DATA COMP	6- 28	21	-1 1/2	-6.6
O	CODEX CORP	6- 25	17 1/4	-1 3/4	-9.2
O	COGNITRONICS	2- 5	2 1/2	- 1/8	-4.7
O	COMPUTER COMMUN.	1- 7	3 5/8	+ 1/2	+16.0
A	COMPUTER EQUIPMENT	2- 4	2 3/4	+ 1/8	+4.7
O	COMPUTER MACHINERY	7- 13	12 5/8	+2 1/4	+21.6
O	COMPUTER TRANSCEIVER	2- 9	5 3/8	+ 1/8	+2.3
A	COMPUTEST	3- 9	4 1/8	+ 1/8	+3.1
N	CONRAC CORP	24- 39	30 1/4	-1 5/8	-5.0
A	DATA PRODUCTS CORP	3- 7	4 1/4	+ 1/4	+6.2
O	DATA RECOGNITION	1- 5	1 1/4	0	0.0
O	DATA TECHNOLOGY	2- 5	2 7/8	+ 3/8	+15.0
O	DI/AN CONTROLS	0- 8	4 1/8	- 1/8	-2.9
N	ELECTRONIC M & M	3- 8	5 1/8	- 1/4	-4.6
O	FABRI-TEK	2- 5	3 5/8	- 1/8	-3.3
O	GENERAL COMPUTER SYS	6- 16	8	+2 1/4	+39.1
N	GENERAL ELECTRIC	59- 74	73 1/2	+ 5/8	+0.8
N	HAZELTINE CORP	7- 13	8	0	0.0
O	INFOREX INC	20- 36	21 3/4	- 3/4	-3.3
O	INFORMATION DISPLAYS	1- 5	1 3/8	0	0.0
O	INFORMATION INTL INC	8- 25	13 1/2	-1 1/4	-8.4
A	LUNDY ELECTRONICS	8- 14	8 7/8	+ 1/4	+2.8
O	MANAGEMENT ASSIST	1- 1	3/8	0	0.0
A	MILGO ELECTRONICS	15- 44	20 1/4	-3 5/8	-15.1
N	MOHAWK DATA SCI	11- 27	11 1/4	-1 5/8	-12.6
O	ODEC COMPUTER SYST.	6- 12	5	0	0.0
O	OPTICAL SCANNING	6- 16	5 3/4	- 1/2	-8.0
O	PERTEC CORP	7- 17	7 1/4	- 3/4	-9.3
O	PHOTON	6- 15	5 3/4	- 5/8	-9.8
A	POTTER INSTRUMENT	7- 21	7 3/4	- 1/2	-6.0
O	PRECISION INST.	3- 13	3 1/4	0	0.0
O	RECOGNITION EQUIP	5- 15	8	+ 5/8	+8.4
N	SANDERS ASSOCIATES	13- 21	16 5/8	- 5/8	-3.6
O	SCAN DATA	5- 13	4 5/8	- 1/4	-5.1
O	STORAGE TECHNOLOGY	17- 39	31 1/2	-2 1/4	-6.6
O	SYCOR INC	7- 11	9 3/4	+ 1/2	+5.4
O	TALLY CORP.	8- 15	12 7/8	+1 3/4	+15.7
N	TEKTRONIX INC	34- 64	52 1/8	+2 1/4	+4.5
N	TELEX	6- 15	5 5/8	- 1/8	-2.1
O	WILTEK INC	10- 26	17 1/4	- 1/4	-1.4
	SUPPLIES & ACCESSORIES				
O	BALTIMORE BUS FORMS	5- 9	8 3/4	+1 1/4	+16.6
A	BARRY WRIGHT	9- 14	11 3/8	-1	-8.0
A	DATA DOCUMENTS	17- 26	21 5/8	- 1/8	-0.5
O	DUPLEX PRODUCTS INC	8- 16	9 1/2	0	0.0
N	ENNIS BUS. FORMS	6- 10	8 1/4	- 1/8	-1.4
O	GRAHAM MAGNETICS	15- 27	19 1/2	+ 1/2	+2.6
O	GRAPHIC CONTROLS	11- 15	11 5/8	- 5/8	-5.1
N	3M COMPANY	76- 86	85 7/8	+ 3/8	+0.4
O	MOORE CORP LTD	42- 57	56 3/4	+ 1/4	+0.4
N	NASHUA CORP	48- 62	55 1/2	-1 1/4	-2.2
O	REYNOLDS & REYNOLD	37- 77	48 3/4	+ 1/2	+1.0
O	STANDARD REGISTER	14- 20	19 1/2	+1	+5.4
O	TAB PRODUCTS CO	14- 23	22 1/2	0	0.0
N	UARCO	21- 28	22 1/2	+ 7/8	+4.0
A	WABASH MAGNETICS	6- 11	6 7/8	- 1/4	-3.5
N	WALLACE BUS FORMS	21- 26	25 1/8	+ 1/2	+2.0
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	147-229	227 3/4	+3 1/2	+1.5
N	COLLINS RADIO	14- 27	22 3/8	-2 5/8	-10.5
N	CONTROL DATA CORP	43- 78	56	-4 3/4	-7.8
O	DATA GENERAL CORP	56-126	125 1/2	+13 1/2	+12.0
O	DIGITAL COMP CONTROL	5- 25	5 3/4	0	0.0
N	DIGITAL EQUIPMENT	72-101	97 1/4	+3 3/4	+4.0
N	ELECTRONIC ASSOC.	6- 13	8 1/2	+ 1/4	+3.0
A	ELECTRONIC ENGINEER.	6- 14	9	+ 7/8	+10.7
N	FOXBORO	23- 41	30 1/4	-1 1/8	-3.5
O	GENERAL AUTOMATION	13- 49	47 3/4	-1	-2.0
O	GRI COMPUTER CORP	2- 5	2 1/2	0	0.0
N	HEWLETT-PACKARD CO	46- 91	91	+3 1/4	+3.7
N	HONEYWELL INC	118-170	133 1/4	-1 3/4	-1.2
N	IBM	333-426	411 1/2	- 1/4	0.0
O	INTERDATA INC	8- 16	12 1/2	+1 1/4	+11.1
N	MEMOREX	15- 38	17 7/8	+ 3/8	+2.1
O	MICRODATA CORP	5- 10	9	+ 1/4	+2.8
N	NCR	29- 38	31 1/2	- 3/8	-1.1
N	RAYTHEON CO	27- 47	33 3/8	- 1/4	-0.7
N	SPERRY RAND	30- 50	49 1/8	+ 1/8	+0.2
A	SYSTEMS ENG. LABS	7- 16	7 5/8	- 1/8	-1.6
N	VARIAN ASSOCIATES	14- 22	19	+ 1/2	+2.7
N	WANG LABS.	23- 61	30 3/4	-1 1/4	-3.9
N	XEROX CORP	121-172	151 1/4	- 3/4	-0.4
	LEASING COMPANIES				
A	BOOTHE COMPUTER	3- 18	3 1/8	0	0.0
O	BRESNAHAN COMP.	1- 3	1 3/8	- 1/8	-8.3
O	COMDISCO INC	3- 18	15 7/8	- 5/8	-3.7
O	COMMERCE GROUP CORP	5- 11	6	- 1/8	-2.0
O	COMPUTER EXCHANGE	1- 3	3/4	0	0.0
A	COMPUTER INVSTRS GRP	7- 14	8 1/4	+ 3/4	+10.0
O	COMP. INSTALLATIONS	2- 5	2	0	0.0
N	DPF INC	5- 13	6	+ 1/4	+4.3
M	DATRONIC RENTAL	2- 4	2	0	0.0
A	DCL INC	2- 10	2 3/8	- 1/2	-17.3
A	DEARBORN-STORM	16- 26	24 7/8	+2 5/8	+11.7
A	DPA, INC.	5- 8	7 5/8	+ 1/2	+7.0
A	GRANITE MGT	5- 11	5 7/8	- 3/8	-6.0
A	GREYHOUND COMPUTER	6- 11	5 5/8	- 1/2	-8.1
A	ITEL	7- 12	10 1/2	- 3/4	-6.6
N	LEASCO CORP	17- 24	17 1/2	- 1/2	-2.7
O	LEASPAC CORP	6- 15	7	+ 1/4	+3.7
O	LECTRO MGT INC	1- 4	2 1/8	- 1/8	-5.5
A	ROCKWOOD COMPUTER	2- 7	2 5/8	- 1/4	-8.6
O	SYSTEMS CAPITAL	3- 20	13	+1 1/4	+10.6
N	U.S. LEASING	19- 35	34 5/8	+1	+2.9

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
P=PHIL-BALT-WASH
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Computer Stocks Trading Index



Earnings Reports

LUNDY ELECTRONICS & SYSTEMS
Three Months Ended Sept. 30

	1972	1971
Shr Ernd	$.01	$.03
Revenue	3,732,897	3,017,981
Earnings	10,244	23,384

ROCKWOOD COMPUTER
Six Months Ended Sept. 30

	1972	a1971
Shr Ernd	$.11	$.37
Revenue	23,806,633	23,535,397
Spec Item	b43,326	c316,849
Earnings	505,427	1,224,347

a-Restated. b-Charge; loss on sale of assets and gain on repurchase of company's debentures. c-Credit; gain on repurchase of company's debentures.

CALIFORNIA COMPUTER PRODUCTS
Year Ended June 30

	a1972	a1971
Shr Ernd	.....	$.98
Revenue	$53,871,000	44,650,000
Earnings	(12,899,000)	2,279,000

a-Report notes that fiscal 1972 results are in accordance with new accounting policies. Prior years are not restated.

DATATAB
Three Months Ended Sept. 30

	1972	1971
Shr Ernd	$.08	$.01
Revenue	1,377,478	980,298
Earnings	66,130	9,440
9 Mo Shr	.19	.11
Revenue	3,923,272	3,004,872
Spec Chg	4,476	.....
Earnings	164,200	94,179

SANGAMO ELECTRIC
Nine Months Ended Sept. 30

	1972	1971
Shr Ernd	$1.04	.....
Revenue	64,045,000	a63,252,000
Disc Op	.....	(1,715,000)
Spec Chg	.....	b1,685,000
Earnings	2,825,000	(1,348,000)

a-From continuing operations. b-Primarily from disposal and writeoff of substantially all the assets of Transitel Computer & Support System Division.

SCANTLIN ELECTRONICS
Nine Months Ended Sept. 30

	1972	1971
Shr Ernd	.....	$1.13
Revenue	$7,883,471	5,189,954
Spec Cred	.....	a5,477,714
Earnings	(2,223,867)	2,405,607

a-Consists of tax credit from loss applied against extraordinary license fee income, gain from sale of license fees, and tax loss carryforward.

LEASCO
Three Months Ended Sept. 30

	1972	1971
Shr Ernd	$.74	$.30
Revenue	168,679,000	153,094,000
Spec Item	a1,340,000	b899,000
Earnings	11,944,000	4,937,000
9 Mo Shr	2.00	1.30
Revenue	484,543,000	446,094,000
Spec Credit	3,000,000	1,203,000
Earnings	32,410,000	20,874,000

a-Credit; gain on insurance investment. b-Charge.

CLARY
Nine Months Ended Sept. 30

	1972	a1971
Shr Ernd	$.16	$.58
Revenue	9,330,000	8,239,000
bSpec Cred	15,000	650,000
Earnings	248,000	875,000

a-Restated to reflect acquistion on a pooling-of-interests basis. b-In 1972 from purchase of debentures; in 1971 gain from sale of assets and elimination of certain liabilities, less loss related to discontinued computer operations.

TYMSHARE
Nine Months Ended Sept. 30

	1972	1971
Shr Ernd	$.21	$.14
Revenue	11,195,922	9,338,225
aSpec Cred	275,000	189,000
Earnings	606,538	404,082

a-Tax loss carryforward.

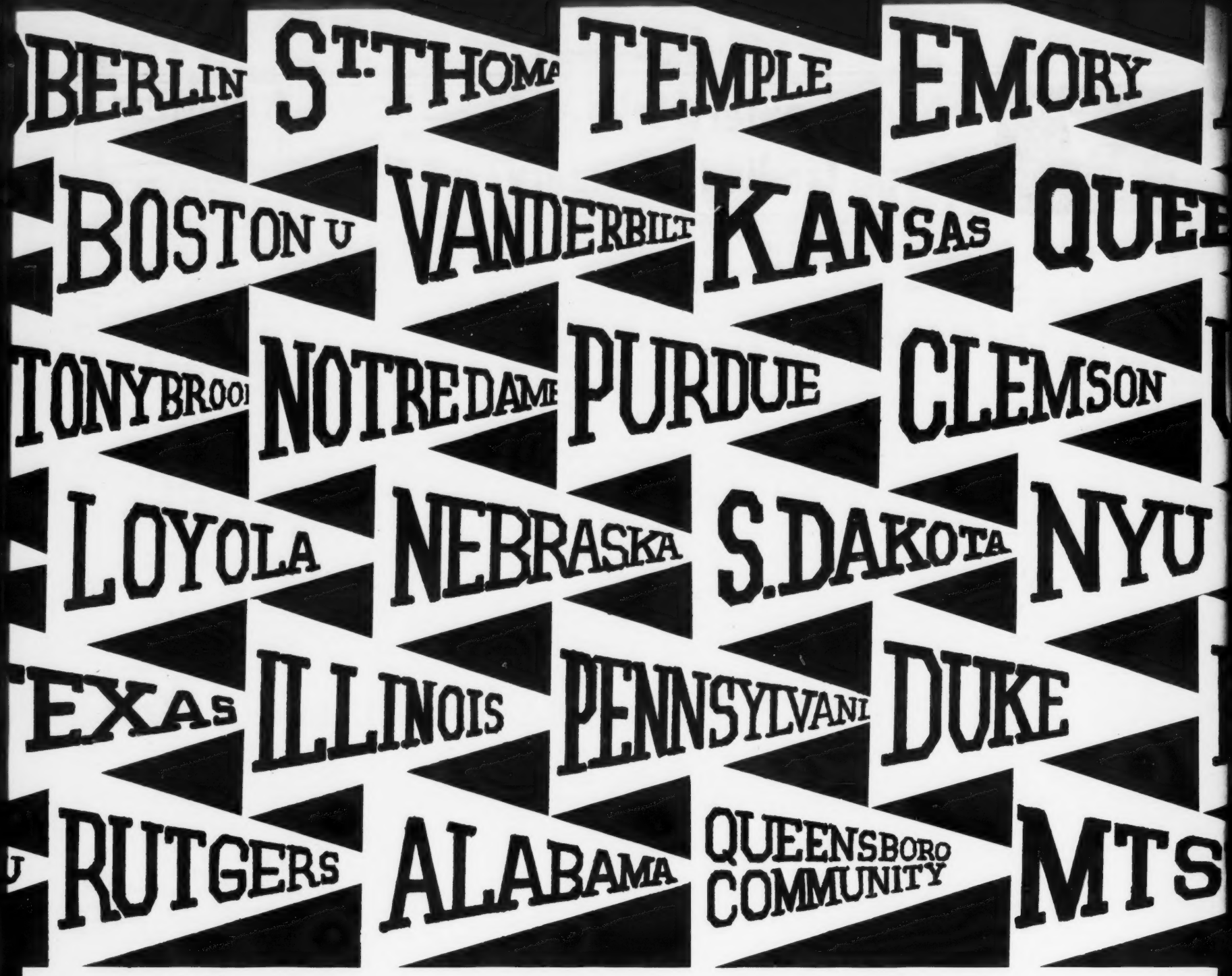
FABRI-TEK
Three Months Ended Sept. 30

	1972	a1971
Shr Ernd	$.04	.....
Revenue	5,401,534	$2,958,719
Disc Op	.....	(79,328)
bSpec Cred	10,008	15,180
Earnings	135,548	(446,105)
6 Mo Shr	.04	.34
Revenue	9,730,340	6,292,680
Disc Op	.....	47,519
bSpec Cred	77,858	1,912,615
Earnings	116,007	1,091,611

a-Restated to reflect accounting changes. b-Gain on purchase of company's outstanding debentures and in 1971 six months includes gain on sale of Nicolet Instrument Corp.

MEMOREX
Nine Months Ended Sept. 30

	1972	1971
Shr Ernd	$.15	.....
Revenue	105,979,000	$80,627,000
Earnings	582,000	(5,276,000)



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